

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER VR-201-A

Healy Systems, Inc. Phase II  
Enhanced Vapor Recovery (EVR) System  
Not Including ISD

WHEREAS, the California Air Resources Board (ARB) has established, pursuant to California Health and Safety Code sections 25290.1.2, 39600, 39601 and 41954, certification procedures for systems designed for the control of gasoline vapor emissions during motor vehicle fueling operations (Phase II EVR vapor recovery systems) in its CP-201, **Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities** (Certification Procedure) as last amended July 22, 2004, incorporated by reference in title 17, California Code of Regulations, section 94011;

WHEREAS, ARB has established, pursuant to California Health and Safety Code sections 39600, 39601, 39607, and 41954, test procedures for determining the compliance of Phase II vapor recovery systems with emission standards;

WHEREAS, Healy Systems, Inc. (Healy) requested certification of the Healy Systems, Inc. Phase II Enhanced Vapor Recovery (EVR) System (Healy Phase II EVR System Not Including In-Station Diagnostics (ISD));

WHEREAS, the Certification Procedure provides that the ARB Executive Officer shall issue an Executive Order if he or she determines that the vapor recovery system conforms to all of the applicable requirements set forth in the Certification Procedure;

WHEREAS, I, Catherine Witherspoon, California Air Resources Board Executive Officer, find that the Healy Phase II EVR System Not Including ISD conforms with all requirements set forth in the Certification Procedure, including compatibility when fueling vehicles equipped with onboard refueling vapor recovery systems, and results in a vapor recovery system which is at least 95.0 percent efficient and shall not exceed 0.38 pounds of hydrocarbons per 1,000 gallon of gasoline transferred when tested pursuant to TP-201.2, **Efficiency and Emission Factor for Phase II Systems** (October 8, 2003);

NOW, THEREFORE, IT IS HEREBY ORDERED that the Healy Phase II EVR System Not Including ISD is certified to be at least 95 percent efficient and does not exceed 0.38 pounds of hydrocarbon per 1,000 gallons of gasoline transferred in attended and/or self-service mode when used with an ARB-certified Phase I

vapor recovery system and installed, operated, and maintained as specified herein and in the following exhibits. Exhibit 1 contains a list of the equipment certified for use with the Healy Phase II EVR System Not Including ISD. Exhibit 2 contains the performance standards, specifications, typical installation drawings and maintenance intervals applicable to the Healy Phase II EVR System Not Including ISD as installed in a gasoline dispensing facility (GDF). Exhibit 3 contains the manufacturing specifications. Exhibit 4 is the test procedure for verifying performance of the Healy Clean Air Separator. Exhibit 5 is the vapor to liquid ratio test procedure for verifying performance of the Healy 900 Nozzle. Exhibit 6 is the Healy Phase II EVR System Limited Warranty. Exhibit 7 is the nozzle bag test procedure. Exhibit 8 is items to consider in conducting TP-201.3.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements, rules and regulations of the Division of Measurement Standards of the Department of Food and Agriculture, the Office of the State Fire Marshal of the Department of Forestry and Fire Protection, the Division of Occupational Safety and Health of the Department of Industrial Relations, and the Division of Water Quality of the State Water Resources Control Board is made a condition of this certification.

IT IS FURTHER ORDERED that Healy shall provide a warranty for the vapor recovery system and components to the initial purchaser and each subsequent purchaser within the warranty period. The manufacturer of components listed in Exhibit 1 not manufactured by Healy Systems, Inc. shall provide a warranty to each of their components certified herein. The warranty shall include the ongoing compliance with all applicable performance standards and specifications and shall comply with all warranty requirements in Section 9.2 of the Certification Procedure. Healy or other manufacturers may specify that the warranty is contingent upon the use of trained installers. Copies of the warranty for the system and components shall be made available to the gasoline dispensing facility owner/operator.

IT IS FURTHER ORDERED that the certified components manufactured by Healy Systems, Inc. shall be 100% performance tested by the manufacturer using the applicable procedures listed in Exhibit 3.

IT IS FURTHER ORDERED that the certified Healy Phase II EVR System Not Including ISD shall be installed, operated, and maintained in accordance with the **ARB Approved Installation, Operation, and Maintenance Manual for the Healy Phase II EVR System Not Including ISD**. A copy of this Executive Order and the **ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD** shall be maintained at each GDF where a certified Healy Phase II EVR System Not Including ISD is installed.



IT IS FURTHER ORDERED that equipment listed in Exhibit 1, unless exempted in writing by ARB, shall be clearly identified by permanent identification number showing the manufacturer's name and model number.

IT IS FURTHER ORDERED that any alteration in the equipment parts, design, installation, or operation of the system certified hereby is prohibited and deemed inconsistent with this certification, unless the alteration has been submitted in writing and approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the Healy Phase II EVR System Not Including ISD shall conduct and pass the following tests no later than 60 days after startup and at least once in each twelve month period, using the following test procedures: TP-201.3, **Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities** (March 17, 1999); Exhibit 4, **Determination of Static Pressure Performance of the Healy Clean Air Separator**; and Exhibit 5, **Vapor to Liquid Volume Ratio for Healy Phase II EVR System**. Shorter time periods may be specified in accordance with local district requirements. Notification of testing, and submittal of test results, shall be done in accordance with local district requirements and pursuant to policies established by that district. Alternative test procedures, including most recent versions of the test procedures listed above, may be used if determined by the ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the Healy Phase II EVR System Not Including ISD shall conduct, and pass, the following tests no later than 60 days after startup using Exhibit 7, **Nozzle Bag Test Procedure**. TP-201.4, **Dynamic Back Pressure** (July 3, 2002), shall be conducted in accordance with the conditions listed in item 1 of the Vapor Recovery Piping Configurations section of Exhibit 2. Local districts have the authority to require conducting of Exhibit 5, **Vapor to Liquid Volume Ratio for Healy Phase II EVR System**, in lieu of TP-201.4, **Dynamic Back Pressure** (July 3, 2002), provided that at least 2 gallons of product are introduced into the system through each dispenser riser prior to conducting the test. Notification of testing and submittal of test results shall be done in accordance with local district requirements and pursuant to the policies established by that district. Alternative test procedures, including most recent versions of the test procedures listed above, may be used if determined by the ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.


IT IS FURTHER ORDERED that, except as provided above, local districts at their option will specify the testing frequency of the nozzle vapor valves. If nozzle vapor

valve tests are required by the district, the test shall be conducted in accordance with Exhibit 7, **Nozzle Bag Test Procedure**.

IT IS FURTHER ORDERED that the Healy Phase II EVR System Not Including ISD shall be compatible with fuels in common use in California at the time of certification and any modifications to comply with future California fuel requirements shall be approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that the certification of the Healy Phase II EVR System Not Including ISD is valid through August 1, 2009.

Executed at Sacramento, California, this 8th day of April 2005.

  
Catherine Witherspoon  
Executive Officer

Attachments:

- Exhibit 1      Equipment List
- Exhibit 2      System Specifications
- Exhibit 3      Healy Manufacturing Performance Standards and Specifications
- Exhibit 4      Determination of Static Pressure Performance of the Healy Clean Air Separator
- Exhibit 5      Vapor to Liquid Volume Ratio for Healy Phase II EVR System
- Exhibit 6      Healy Phase II EVR System Limited Warranty
- Exhibit 7      Nozzle Bag Test Procedure
- Exhibit 8      Items to Consider in Conducting TP-201.3

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Equipment List**

<b><u>Component</u></b>	<b><u>Manufacturer/Model</u></b>	<b><u>State Fire Marshal Identification Number</u></b>
<b>Nozzle</b>	Healy Model 900 (Figure 1A-1)	005:027:028
<b>Tank Pressure Management System</b>	Healy Model 9961 Clean Air Separator (Figure 1A-2)	005:027:029
<b>Inverted Coaxial Hoses</b>	Healy Model 75B Series (3/4" I.D.) (Figure 1A-4) 75B-XXX-YZYZ where XXX represents hose length First two digits for length in feet Last digit - length in tenths of foot Y represents hose end type S = Swivel End F = Fixed End Z represents thread type 2 = Healy Straight Thread 3 = Metric Thread 4 = Balance-Type Thread	005:027:003
<b>Dispenser Conversion Adaptors</b>	Healy Model CX6-A Healy Model CX6-VV1A* Healy Model CX6-VV2A* Healy Model CX6-VV3A* (Figure 1A-5)  Note: Items marked with asterisk (*) are no longer manufactured, but may be used for dispenser retrofit.	005:027:019
<b>Reconnectable Breakaway Coupling</b>	Healy Model 8701VV (Figure 1A-6)	005:027:016

<u>Component</u>	<u>Manufacturer / Model</u>	<u>State Fire Marshal Identification Number</u>
<b>Flow Limiter<sup>1</sup></b>	Healy 1301 (Figure 1A-7)	005:027:020
<b>Pressure/Vacuum Valves</b>	Husky Model 4885	
<b>Dispenser Vacuum Pump</b>		
	Healy Model VP1000 Vacuum Pump	005:027:030
	Healy/Franklin Electric Model VP1000 Vacuum Pump (Figure 1A-3)	005:027:014
<b>Dispensers</b>	Note: Unihose dispensers shall be required unless as provided by Section 4.11 of CP-201.	
	Gilbarco Encore Series	001:026:016 001:026:017
	Healy Retrofit Kits VP1000R <sup>2</sup> or VP1000S <sup>3</sup>  (Figure 1A-8)	
	<u>Model #'s</u>	<u>Description:</u>
	NAO	Encore 1 Grade Multi-hose
	NA1	Encore 2 Grade Multi-hose
	NA2	Encore 3 Grade Multi-hose
	NA3	Encore 4 Grade Multi-hose
	NG0	Encore 3 Grade Single-Hose
	NG1	Encore 4 Grade Single-Hose plus 1
	NG4	Encore 2 Grade Single-Hose
	NJ0	Multi-hose Blender
	NJ2	Multi-hose Blender plus 1
	NL0 NL1 NL2 NL3	Encore X+1 Blender
	NN0 NN1 NN2 NN3	Encore X+0 Blender

<sup>1</sup> Flow limiter is mandatory when the flow rate is greater than 10 gallons per minute to comply with US EPA requirement.

<sup>2</sup> Kit used to install Healy components in Encore Balance series dispenser

<sup>3</sup> Kit used to install Healy components in Encore Assist series dispenser

<u>Component</u>	<u>Manufacturer / Model</u>	<u>State Fire Marshal Identification Number</u>
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GasBoy 9800 Series (Gilbarco)

Healy Retrofit Kit VP1000M<sup>4</sup>

(Figure 1A-9)

<u>Model #'s</u>	<u>Description:</u>
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9852 – Suffix1	Suffix2
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9853 – Suffix1	Suffix2
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Where:

Suffix1 can be:

A	=	Factory fabrication and assembly modifications to chassis
HC	=	High capacity model
M	=	Manifold supply inlet at the pumping unit inlet
TW1	=	Manifold supply inlet
TW2	=	Two individual supply inlets
X	=	Dispenser supplied by a submersible pump
Q	=	Utilizes an alternate meter and Pump

Suffix2 can be:

B	=	Battery back-up for electronics
C	=	Pump Interface
D	=	DC conduit and junction box
F	=	Fuel filter
G	=	Imperial gallons registration
H	=	High hose retriever
I	=	Internal hose retriever
L	=	Lighted panel
N	=	Equipped to handle a long spout nozzle
P	=	Satellite dispenser as part of the unit (for connection to a master pump)
PP	=	Solenoid valves (optional only on pumps)
R	=	Liters registration
S	=	Piping for connection to satellite
SS	=	Stainless steel panels

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<sup>4</sup> Kit used to install Healy components in GasBoy 9800 series dispenser

<u>Component</u>	<u>Manufacturer / Model</u>	<u>State Fire Marshal Identification Number</u>
	SSA =	Equipped with stainless steel doors
	SSTS=	Stainless steel tops and doors
	T =	Mechanical totalizer
	U =	Submersible drive relays
	W =	Heater
	Y =	Vapor recovery ready
	Z =	Front Load Nozzle
	2 =	230 VAC/60hz operation
	3 =	230 VAC/60hz operation with 380VAC/60hz motor (available on all models except 9852Q)
	25 =	230VAC/50hz operation
	35 =	230VAC/50hz operation with 380VAC/50hz motor
	4 =	RS-485 interface
	5 =	50hz operation
	7 =	Electronic totalizer activator on both sides
	9 =	Provided with 900-R Series TopKat

#### Wayne Harmony Series

Healy Retrofit Kits VP1000N<sup>5</sup> or VP1000Q<sup>6</sup>

(Figure 1A-10)

Model #'s                      Description:  
prefix/VXXXYZ/suffix

Where:

prefix =	Any number or letter (with a possible "H" for Harmony)
V =	Vista
X =	Any digit
Y =	D or P
	D = remote dispenser type for delivering fuel
	P = suction pump for

<sup>5</sup> Kit used to install Healy components to Harmony Balance series dispenser

<sup>6</sup> Kit used to install Healy components to Harmony Assist series dispenser



<u>Component</u>	<u>Manufacturer / Model</u>	<u>State Fire Marshal Identification Number</u>
		delivering fuel
	Z =	1, 3, 4, 5, 6, 7 or 8
	suffix =	D1 or D2, and any combination of number(s) or letter(s)

### Wayne Ovation Series

Healy Retrofit Kit VP1000P<sup>7</sup>

(Figure 1A-11)

Model #'s

Description:

XYZ/ABC

Where:

X	=	B or R B = Blended Dispenser R = Regular Dispenser
Y	=	Number of hoses per side 1 = one hose per side 2 = two hoses per side
Z	=	Number of inlets per side 1 = one inlet 2 = two inlets 3 = three inlets
A	=	Number of grades 1 = one grade 2 = two grades 3 = three grades 4 = four grades 5 = five grades
B	=	Number of sides 1 = one side 2 = two sides
C	=	Number of columns 1 = one column 2 = two columns

<sup>7</sup> Kit used to install Healy components to Ovation Balance or Assist series dispenser

<u>Component</u>	<u>Manufacturer / Model</u>	<u>State Fire Marshal Identification Number</u>
	Wayne 3 Vista Series	005:019:001

Healy Retrofit Kit VP1000T<sup>8</sup>

(Figure 1A-12)

Model #'s                      Description:  
prefix/VXXXYZ/suffix

Where:

Prefix=                      Any number or letter

V                      =                      Vista

X                      =                      Any digit

Y                      =                      D or P

D = remote dispenser type for  
delivering fuel

P = suction pump for  
delivering fuel

Z                      =                      1, 3, 4, 5, 6, 7 or 8

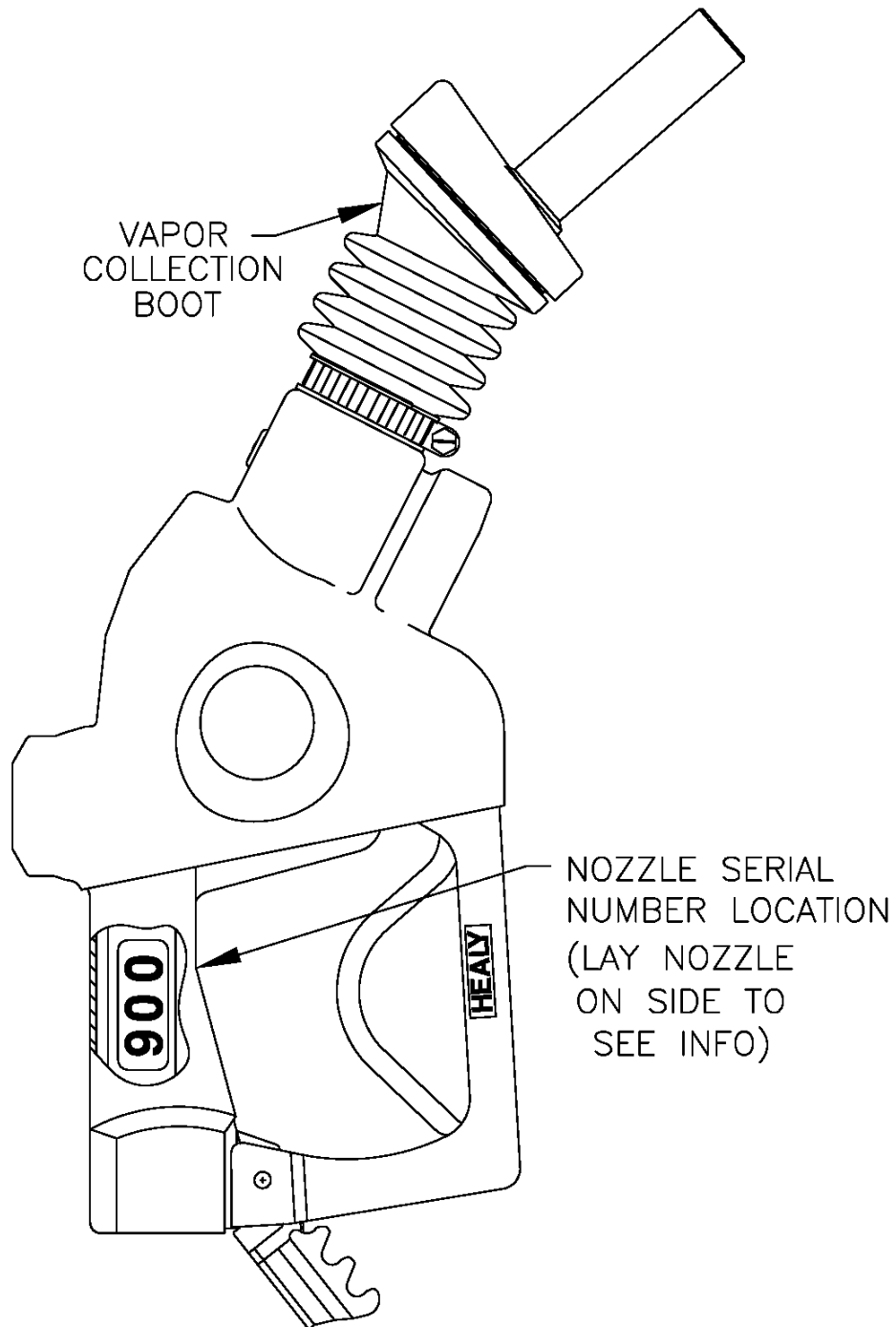
Suffix=                      D1 or D2, and any combination of  
number(s) or letter(s)

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<sup>8</sup> Kit used to install Healy components to Vista series dispenser

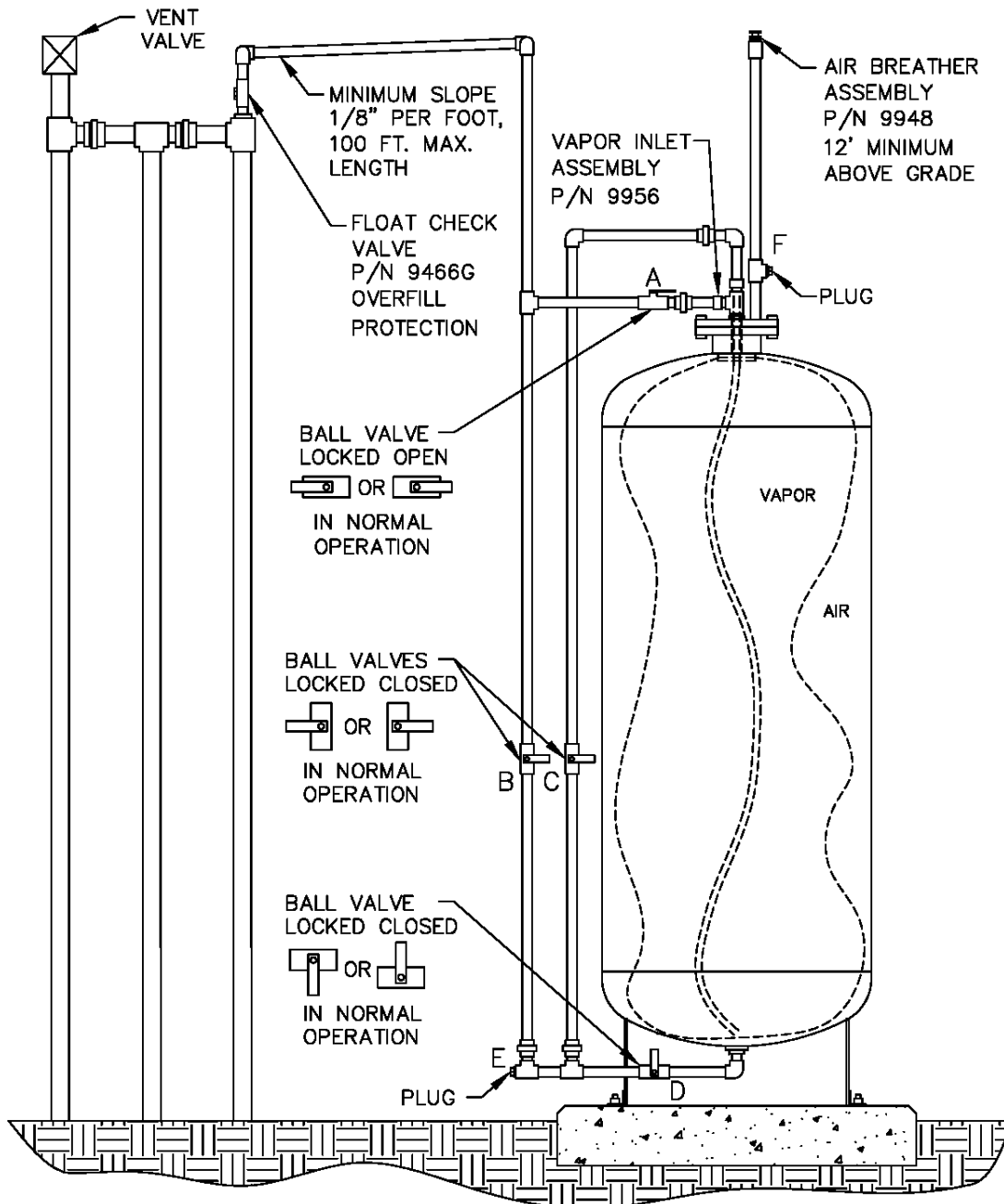
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-1  
Healy Model 900 EVR Nozzle**



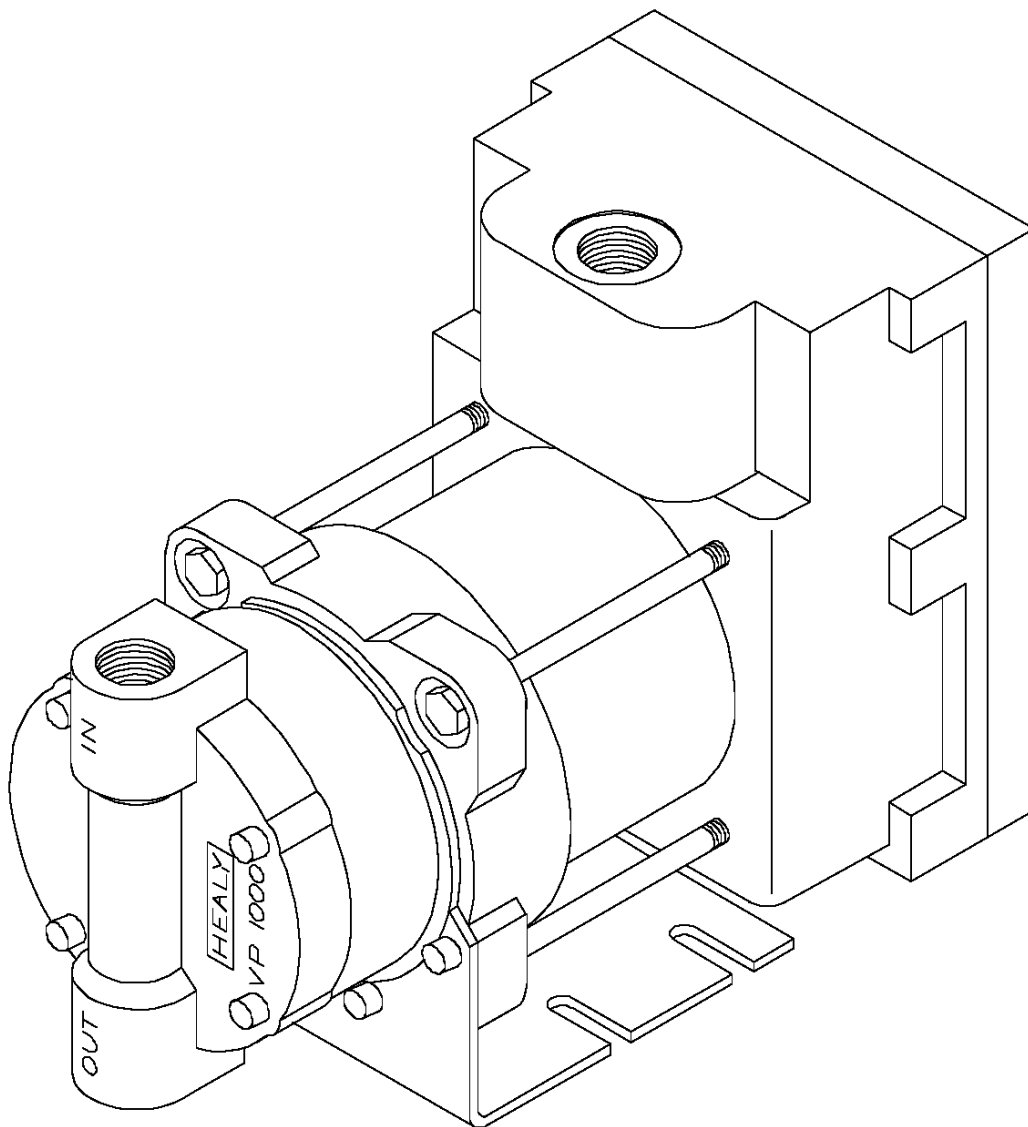
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-2  
Healy Model 9961 Clean Air Separator**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

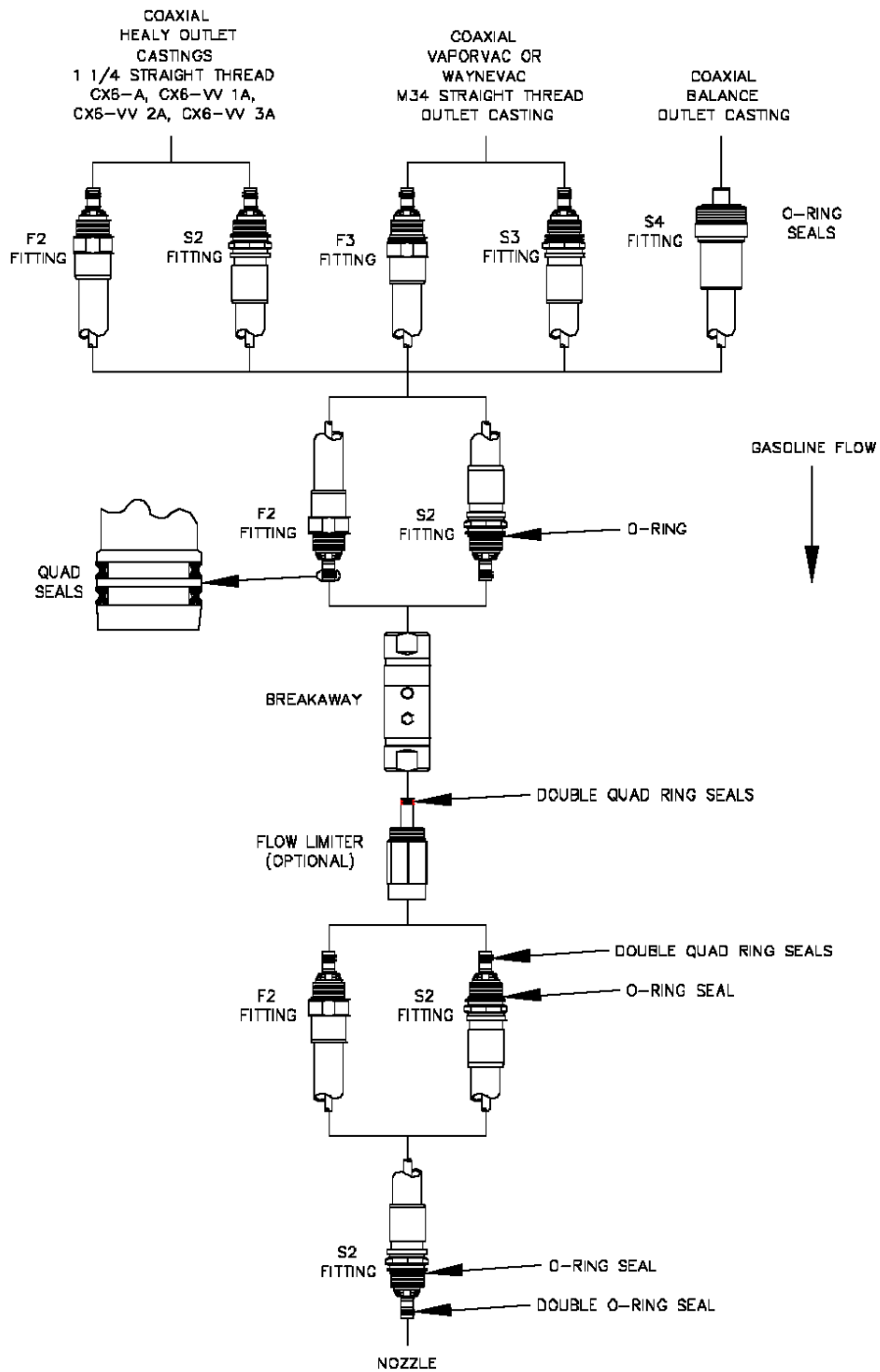
**Exhibit 1  
Figure 1A-3  
Healy Model VP1000 Vacuum Pump**





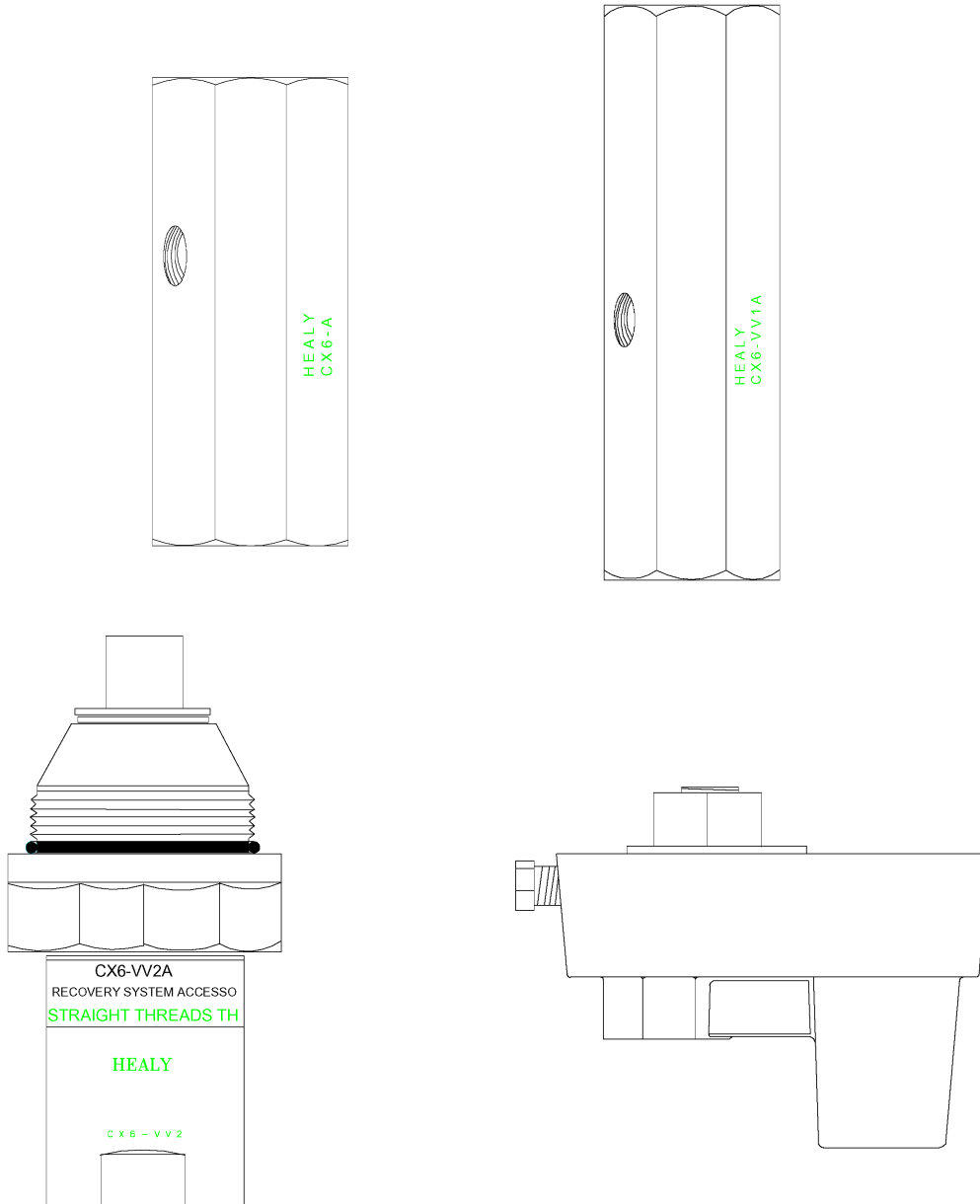
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-4  
Hanging Hardware Selection Options**



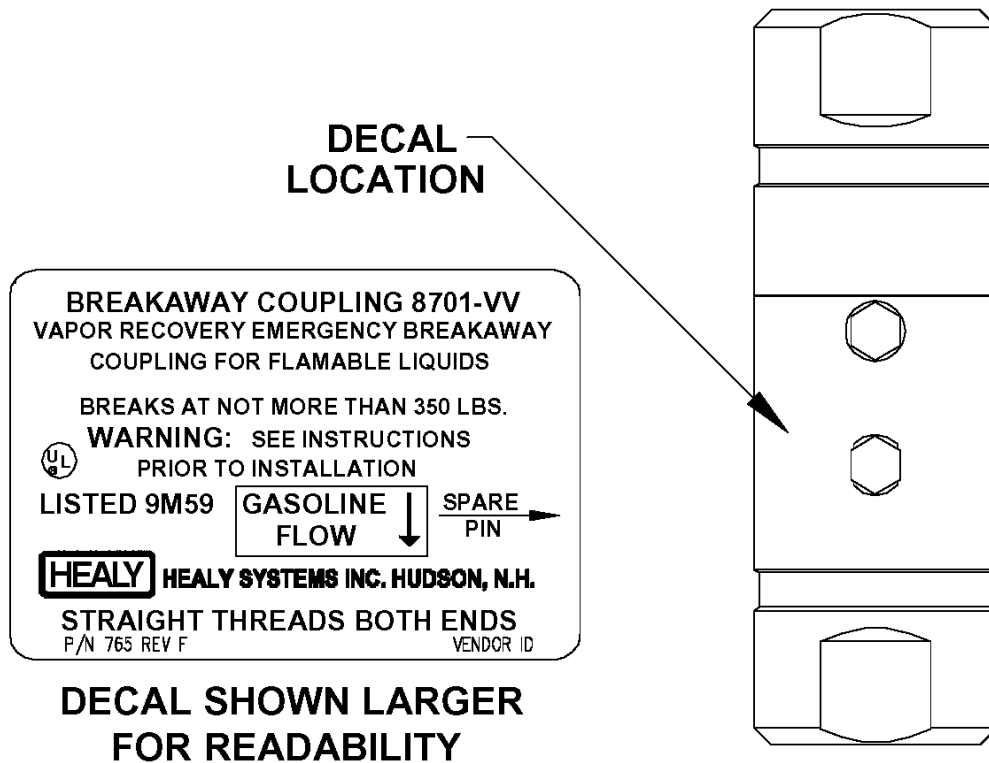
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-5  
Healy Model CX6-A, CX6-VV1A, CX6-VV2A, CX6-VV3A  
Dispenser Conversion Adaptors**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

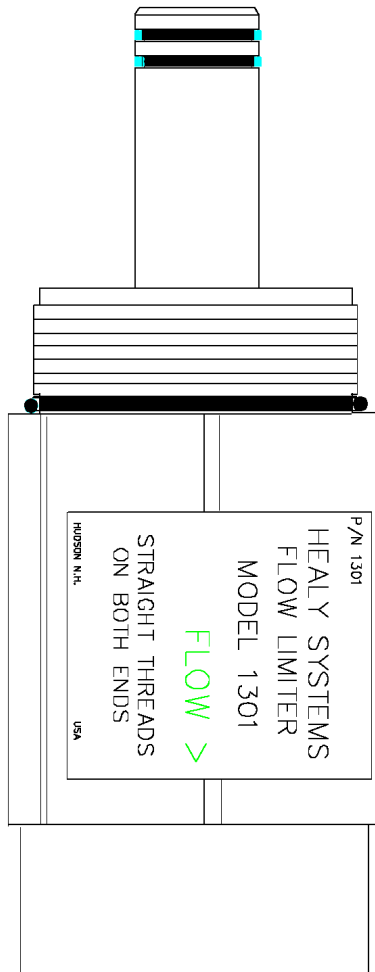
**Exhibit 1  
Figure 1A-6  
Healy Model 8701VV Breakaway**



-13-

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

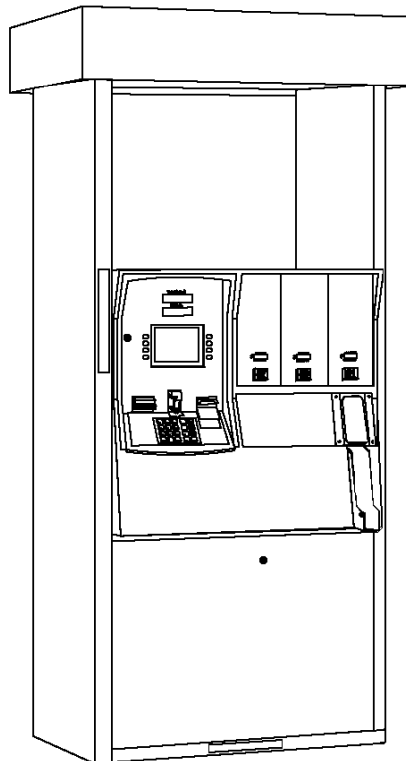
**Exhibit 1  
Figure 1A-7  
Healy Model 1301 Flow Limiter**



-14-

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-8  
Gilbarco Encore Series Dispenser**

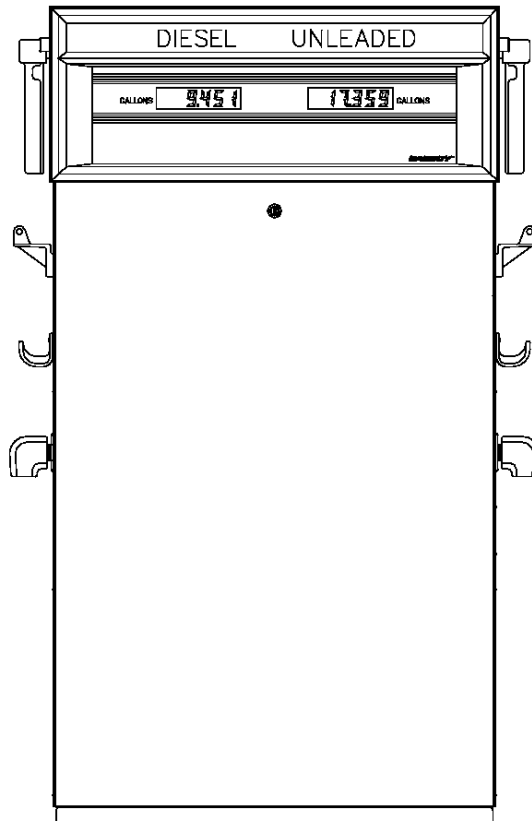




-15-

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-9  
GasBoy 9800 Series (Gilbarco) Dispenser**



-16-

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-10  
Wayne Harmony Series Dispenser**



-17-

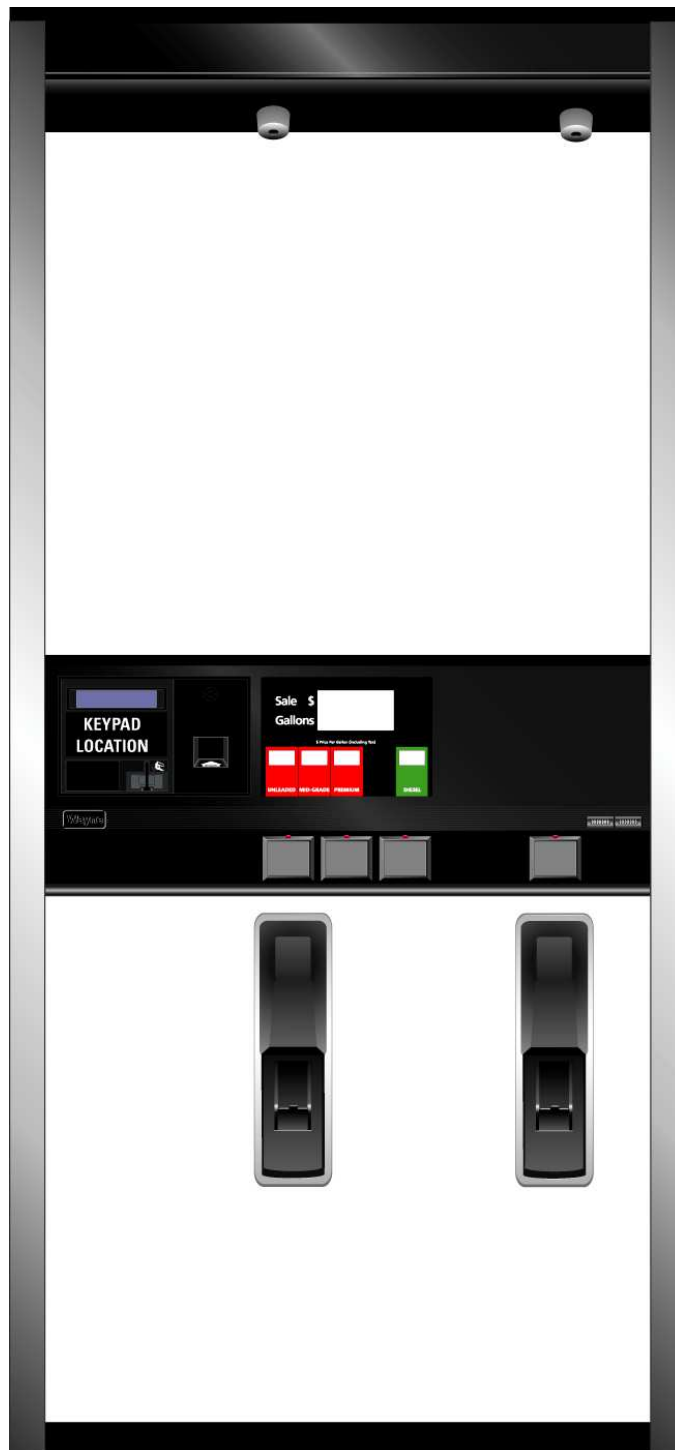
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-11  
Wayne Ovation Series Dispenser**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 1  
Figure 1A-12  
Wayne Vista Series Dispenser**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
System Specifications**

This exhibit contains the installation, maintenance and compliance standards and specifications that apply to the Healy Phase II EVR System Not Including ISD installed in a gasoline dispensing facility. All components must be installed in accordance with the specifications in the **ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD**.

**Nozzle**

1. A vapor collection boot shall be installed on the nozzle at the base of the spout, as shown in **Figure 2B-1**.
2. The Healy Model 900 nozzle has an integral vapor valve which prevents the loss of vapor from the underground storage tanks, ensures proper operation of the system and prevents the ingestion of air into the system. Any dispenser that has a nozzle installed that is determined to have a defective vapor valve, as described in items 3 or 4 below, shall be immediately removed from service (including nozzle(s) on both sides of dispenser) and a call for repair made immediately.
3. The maximum allowable leak rate for the nozzle vapor path, as determined by TP-201.2B, shall not exceed the following:  
  
0.038 cubic feet per minute (CFH) at a pressure of two inches water column (2.00" wc), and  
  
0.10 CFH at a vacuum of one hundred inches water column (-100.00" wc)
4. Verification of the integrity of the vapor valve can be performed on installed nozzles using the nozzle bag test procedure in Exhibit 7.

**Vapor To Liquid Ratio**

1. The V/L ratio of the system shall be **1.05 plus or minus 0.10 (0.95 to 1.15)**, measured at a flow rate between six and ten gallons per minute (6.0 – 10.0 gpm). *Any fueling point whose V/L ratio is determined to be at or below 0.80 shall be deemed defective and removed from service.* The V/L ratio shall be determined by using the test procedure in Exhibit 5 with the shut-off port excluded.



### **Inverted Coaxial Hoses**

1. The maximum length of the hose assembly, including hose adapter, whip hose, breakaway, flow limiter (optional) and inverted coaxial hose, measured at the base of the nozzle, shall be no more than twenty (20) feet.
2. Only standard (**Figure 2B-2**), Lazy-J (**Figure 2B-3**) and Curly-Q (**Figure 2B-4**) hose configurations are permitted.

### **Hose Adaptors**

1. Component necessary to install hanging hardware on some dispenser types.

### **Breakaway Couplings**

1. Only the Healy Model 8701VV breakaway (which closes the vapor path) shall be used.
2. Testing is required after reconnecting the breakaway to ensure proper operation and no observed leaks. The procedure for reconnecting breakaway and fueling point testing after a drive-off, referenced in Section 1.4 of Healy Systems Scheduled Maintenance, shall be conducted to verify that breakaway, hose and nozzle are operating properly after a drive-off.

### **Flow Limiters**

1. Component is optional for vapor recovery.
2. Flow limiter is mandatory when the flow rate is greater than 10 gallons per minute to comply with U.S. EPA requirement.

### **Clean Air Separator**

1. The Clean Air Separator is a passive tank pressure management system, with no electrical requirements. The Clean Air Separator vapor integrity shall be evaluated using the test procedure outlined in Exhibit 4 of this Executive Order.
  - a. A Clean Air Separator that fails the leak decay test outlined in Exhibit 4 shall be considered a defect.
  - b. Unless there is maintenance or testing being conducted on the Clean Air Separator, the four ball valves shall be locked in the positions shown in **Figure 2B-5** for normal Clean Air Separator operation. A Clean Air Separator that is not in the proper operating configuration shall be considered a defect.

2. The Clean Air Separator can be installed up to 100 feet from the vent line(s), provided that this piping is sloped 1/8" per foot minimum toward the vent line(s).
3. The Air Breather Assembly for the Clean Air Separator shall be installed at least twelve feet (12') above grade.

### **Pressure/Vacuum Vent Valves for Storage Tank Vents**

1. The P/V vent valve shall be an ARB-certified valve as specified in Exhibit 1.
2. At least one pressure/vacuum (P/V) vent valve shall be installed on each tank vent. The maximum number of P/V vent valves allowed and P/V vent valve performance specifications are listed in the applicable Phase I EVR Executive Order. Vent lines may be manifold to minimize the number of P/V vent valves and potential leak sources, provided the manifold conforms to all applicable fire regulations. At least one P/V vent valve shall be installed on vents if a manifold is incorporated. **Figure 2B-6** shows a typical manifold configuration for a single P/V vent valve with the Clean Air Separator. If two or more P/V vent valves are desired, they shall be installed in parallel, so that each can serve as a backup to the other if one should fail to open properly. **Figure 2B-7** shows a typical manifold configuration for two P/V vent valves installed in parallel with the Clean Air Separator. **Figure 2B-8** shows a typical manifold configuration for three P/V vent valves installed in parallel with the Clean Air Separator. **Figure 2B-9** shows a typical configuration for a P/V vent valve mounted on a single 3" vent line with the Clean Air Separator.

### **Vapor Recovery Piping Configurations**

**NOTE: New facilities and facilities undergoing Phase II major modifications must also meet the piping requirements specified in section 4.12 of CP-201.**

1. Vapor Return and Vent Lines
  - a. For new installations and existing installations undergoing Phase II major modifications, all vapor return and vent lines shall be a minimum nominal internal diameter of 2 inches from the dispensers to the first manifold. All lines after the first manifold and back to the underground storage tank shall have a minimum nominal internal diameter of 3 inches. Prior to and after backfilling the vapor return and vent lines, the maximum pressure drop shall not exceed 0.5 inches WC at 60 standard cubic feet per hour as determined by TP-201.4, Dynamic Backpressure. The pressure drop shall be measured from the dispenser riser to the UST with pressure/vacuum vent valves installed and with the popped Phase I vapor connection open.
  - b. For existing installations, the maximum pressure drop through the system shall not exceed 0.5 inches WC at 60 standard cubic feet per hour as

determined by TP-201.4, Dynamic Backpressure. The pressure drop shall be measured from the dispenser riser to the UST with the pressure/vacuum vent valves installed and with the poppeted Phase I vapor connection open.

Note: The V/L test from Exhibit 5 may be used to verify proper operation of the system, in lieu of measuring the pressure drop through the lines, provided that at least two gallons of product are introduced into the system through each dispenser riser, prior to the test.

2. All vapor return lines shall have a minimum slope of 1/8 inch per foot from the dispenser riser to the riser of the UST. A slope of 1/4 inch or more per foot is recommended wherever feasible. The vapor return path from any fueling point to the underground storage tank shall be free of liquid blockage.
3. The dispenser shall be connected to the riser with either flexible or rigid material that is listed for use with gasoline. The dispenser-to-riser connection shall be installed so that any liquid in the lines will drain toward the storage tank. The internal diameter of the connector, including all fittings, shall not be less than one-half inch (1/2").
4. There is no length restriction for the vapor return piping of the system as long as the system complies with the maximum pressure drop requirement of Item 1 (or the V/L option).
5. No product shall be dispensed from any fueling point at a GDF installed with the Healy Phase II EVR System Not Including ISD if there is a vapor line that is disconnected and open to the atmosphere.
6. No liquid condensate traps are allowed with this system.

### **Dispenser Vapor Piping**

1. Any dispenser with a dispenser piping test valve in the closed position, shall be considered a defect.

### **Phase I System**

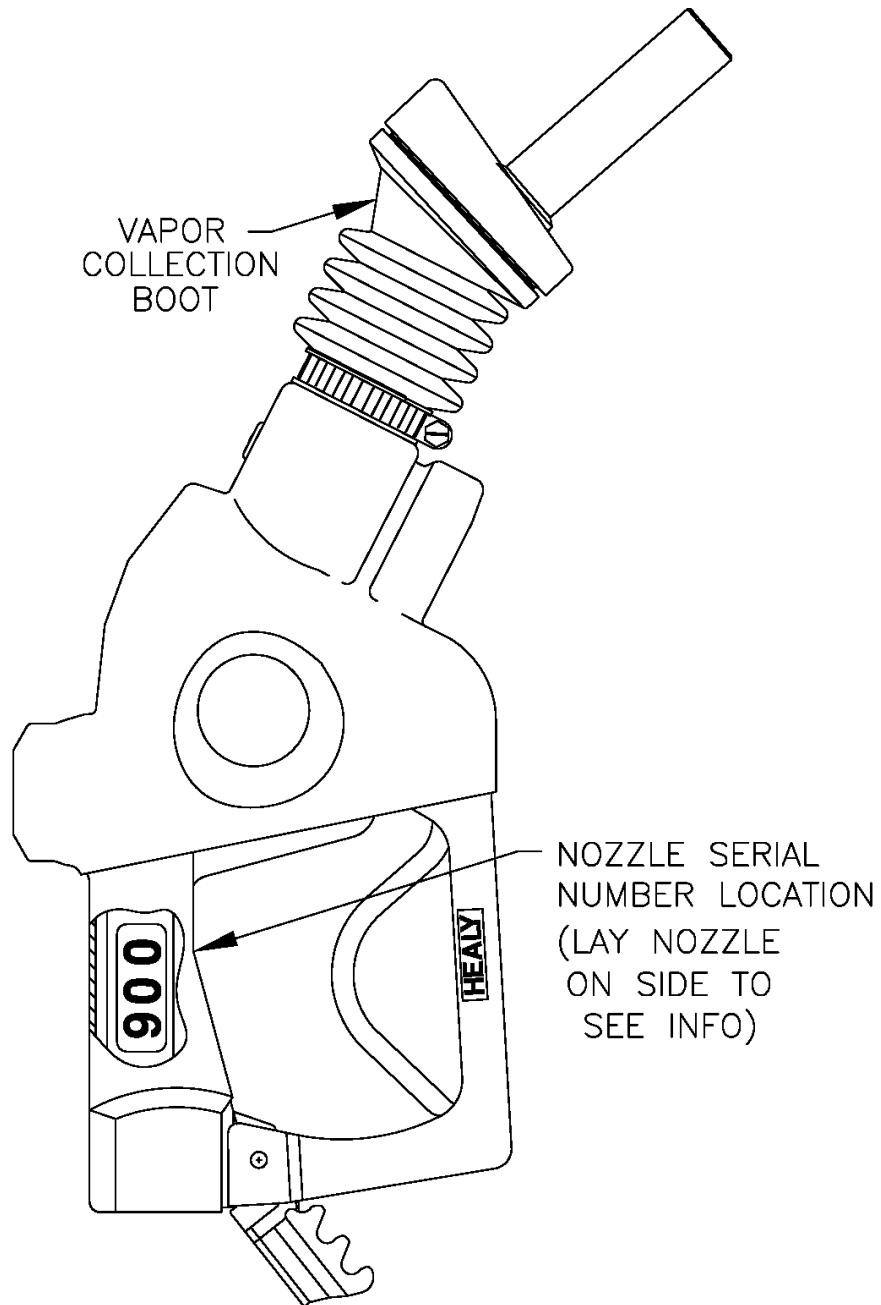
1. The Phase I system shall be an ARB-certified system.

## **Maintenance Records**

1. Each GDF operator/owner shall keep records of maintenance performed at the facility. Such records shall be maintained on site in accordance with district requirements or policies. The records shall include: the date the component is found not to be operating properly, the date that maintenance is requested the date maintenance is performed, test date (if applicable), affiliation, telephone number and name of individual conducting maintenance and/or test. An example of a GDF Maintenance Record is shown in **Figure 2B-10**.
2. Maintenance shall be conducted in accordance with Healy Systems Scheduled Maintenance document in **Figure 2B-11**.
3. Reconnection of breakaways shall be included in the maintenance records.

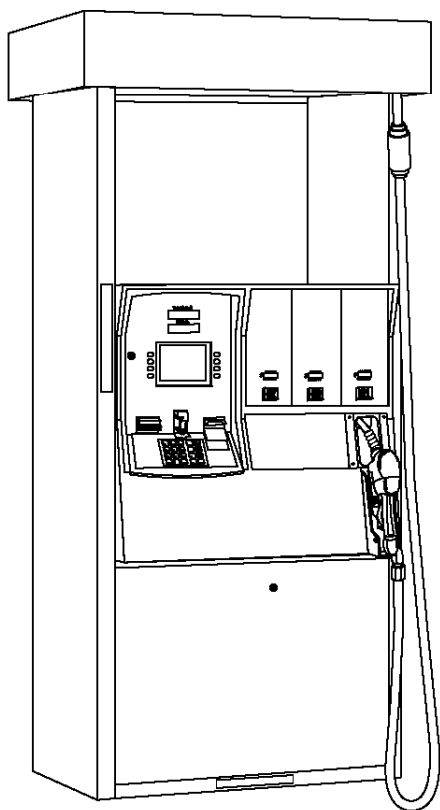
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-1  
Vapor Boot for Healy 900 Nozzle**



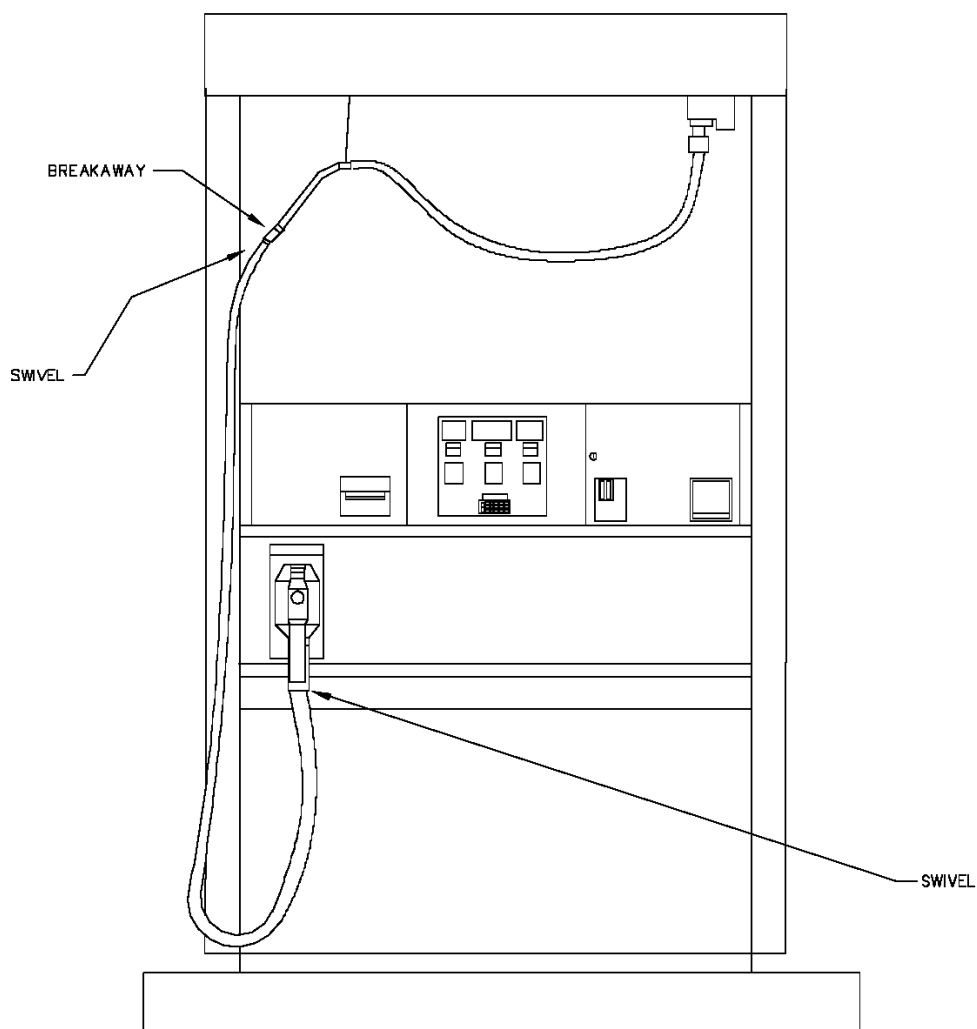
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-2  
Standard Hose Configuration**



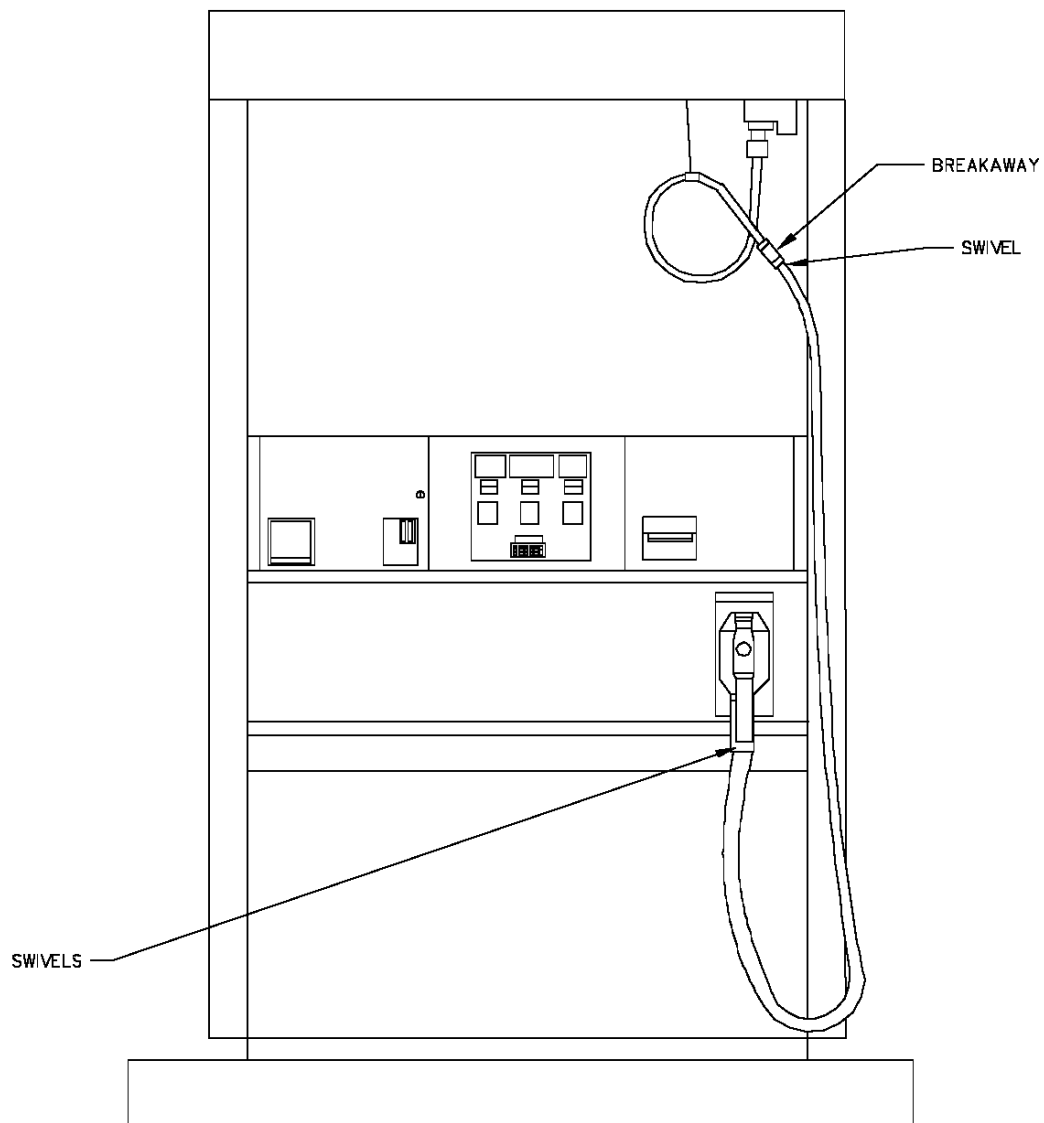
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-3  
Lazy J Hose Configuration**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

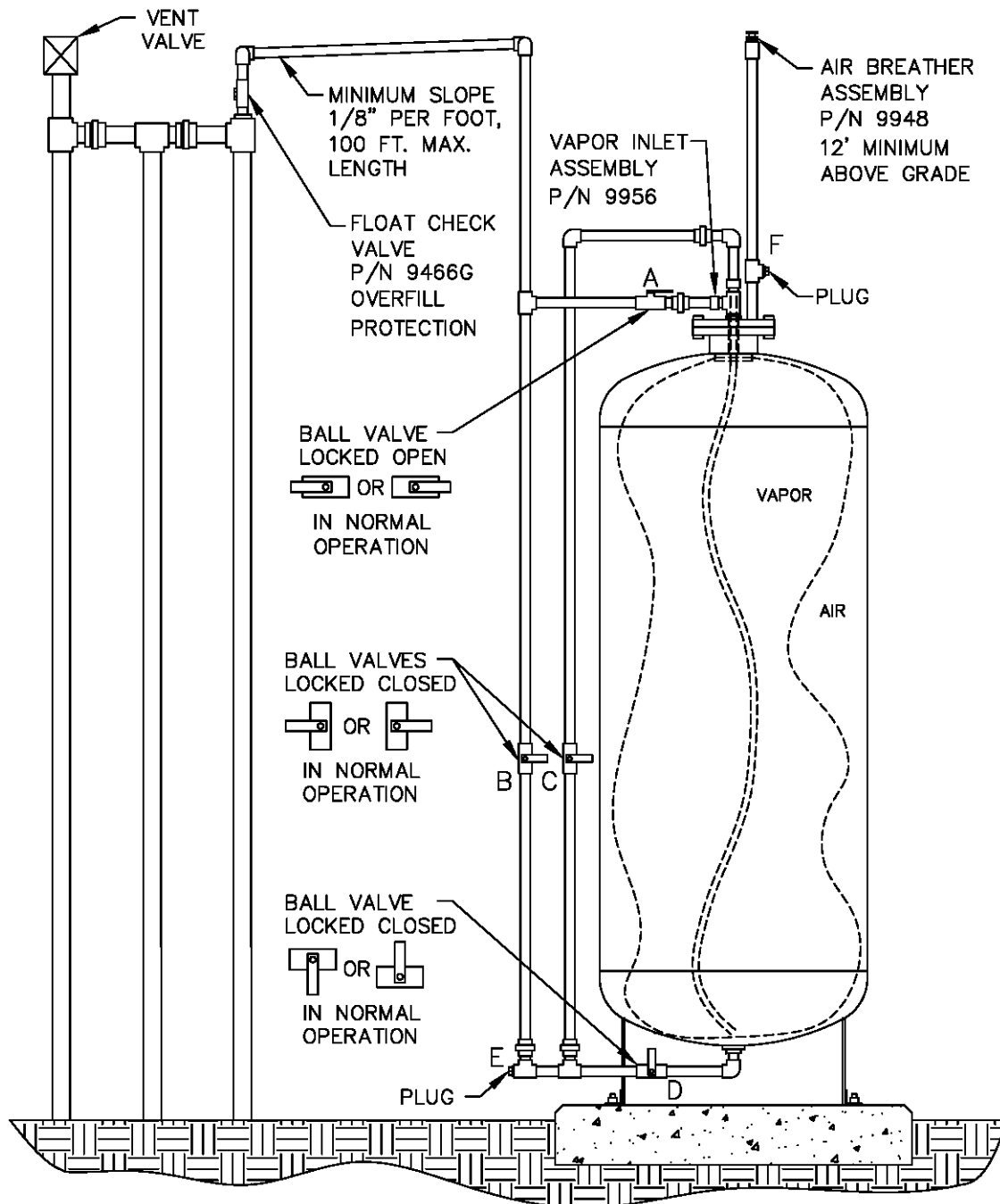
**Exhibit 2  
Figure 2B-4  
Curly Q Hose Configuration**





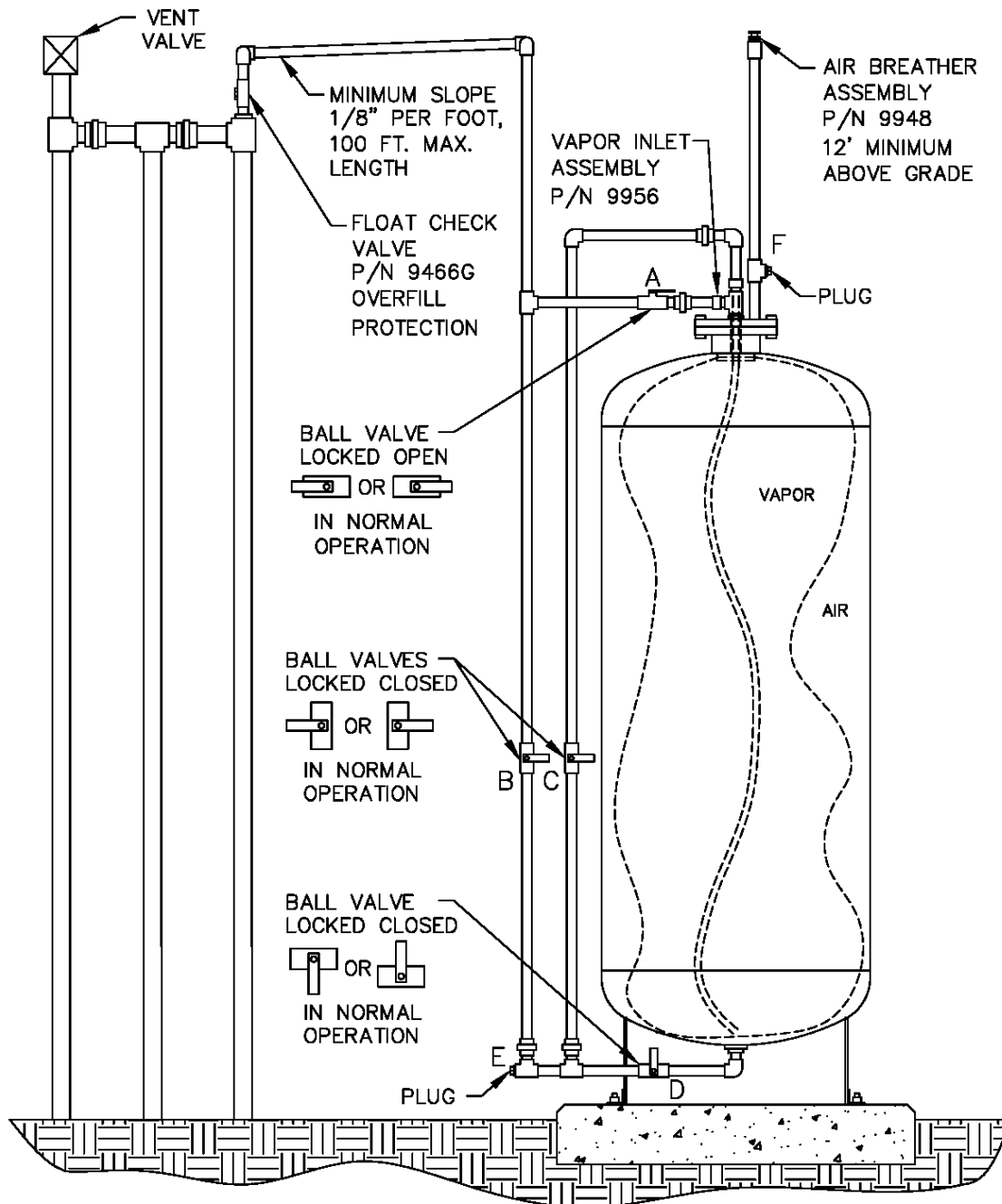
**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-5  
Clean Air Separator Normal Operation Configuration**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-6  
Typical Installation of a Single P/V Vent Valve Manifold  
with Healy Clean Air Separator**

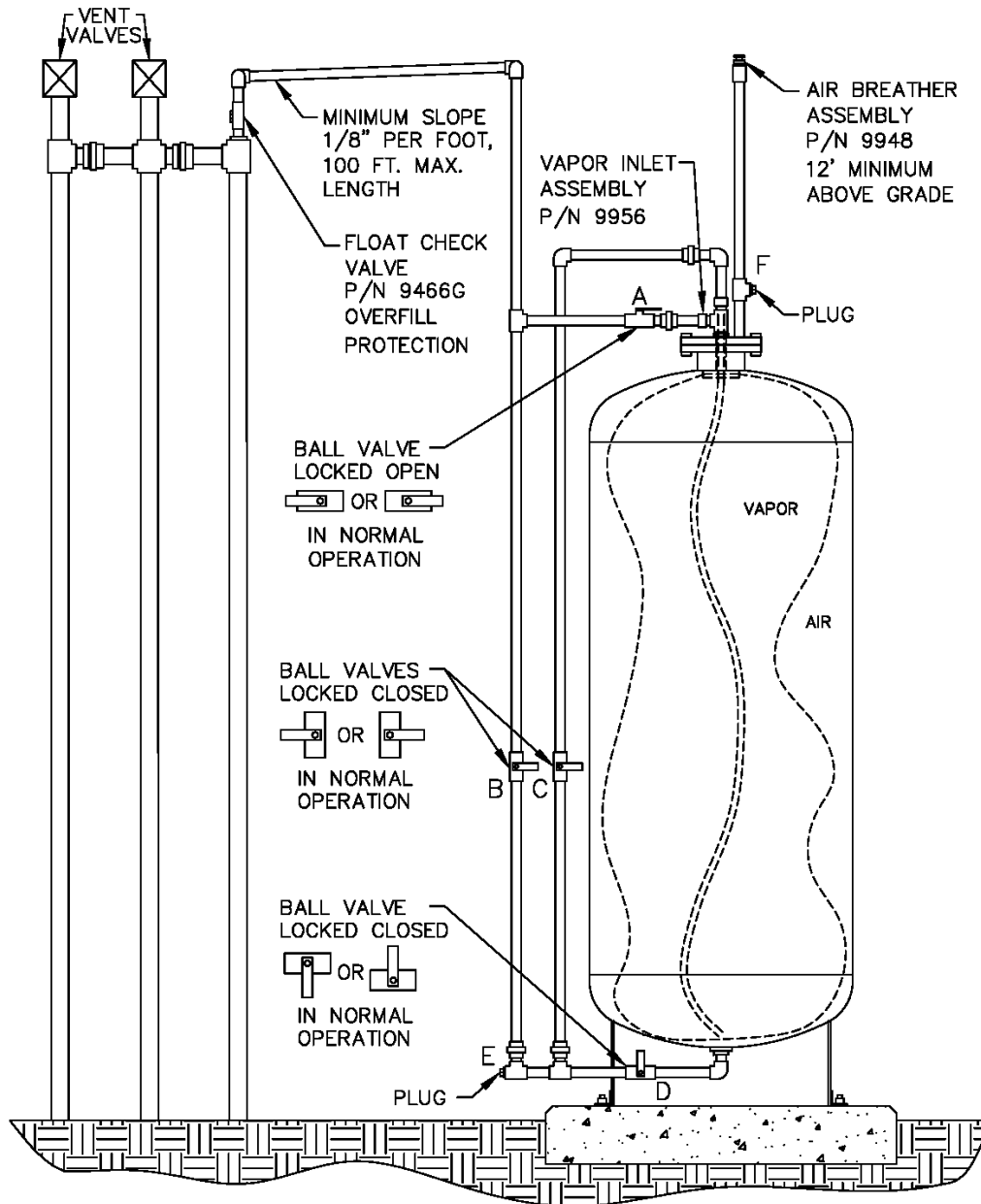


**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-7**

**Typical Installation of a Two P/V Vent Valve Parallel Manifold  
with Healy Clean Air Separator**

(This configuration requires additional P/V vent valves that are not supplied in the Healy installation kit)

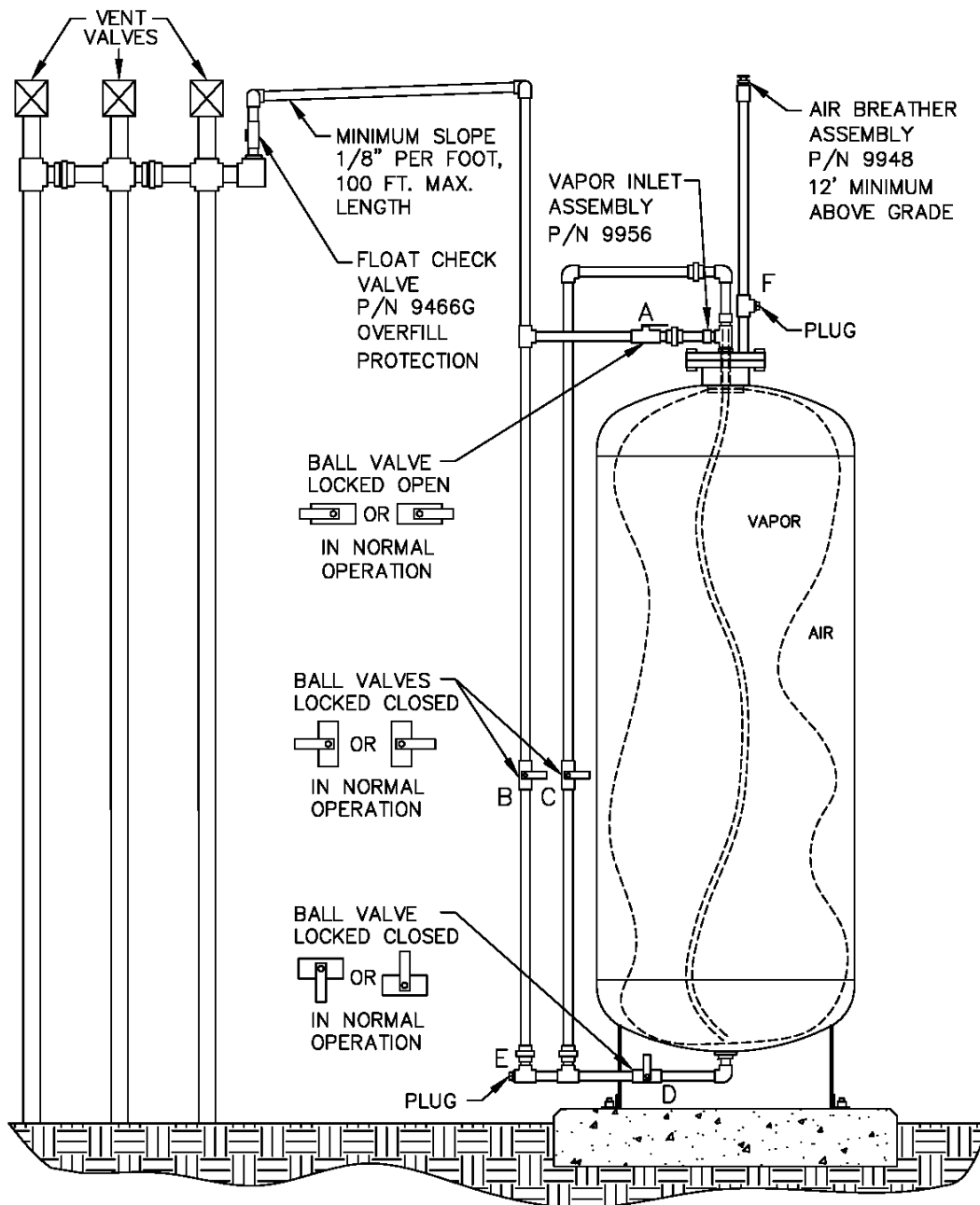


**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-8**

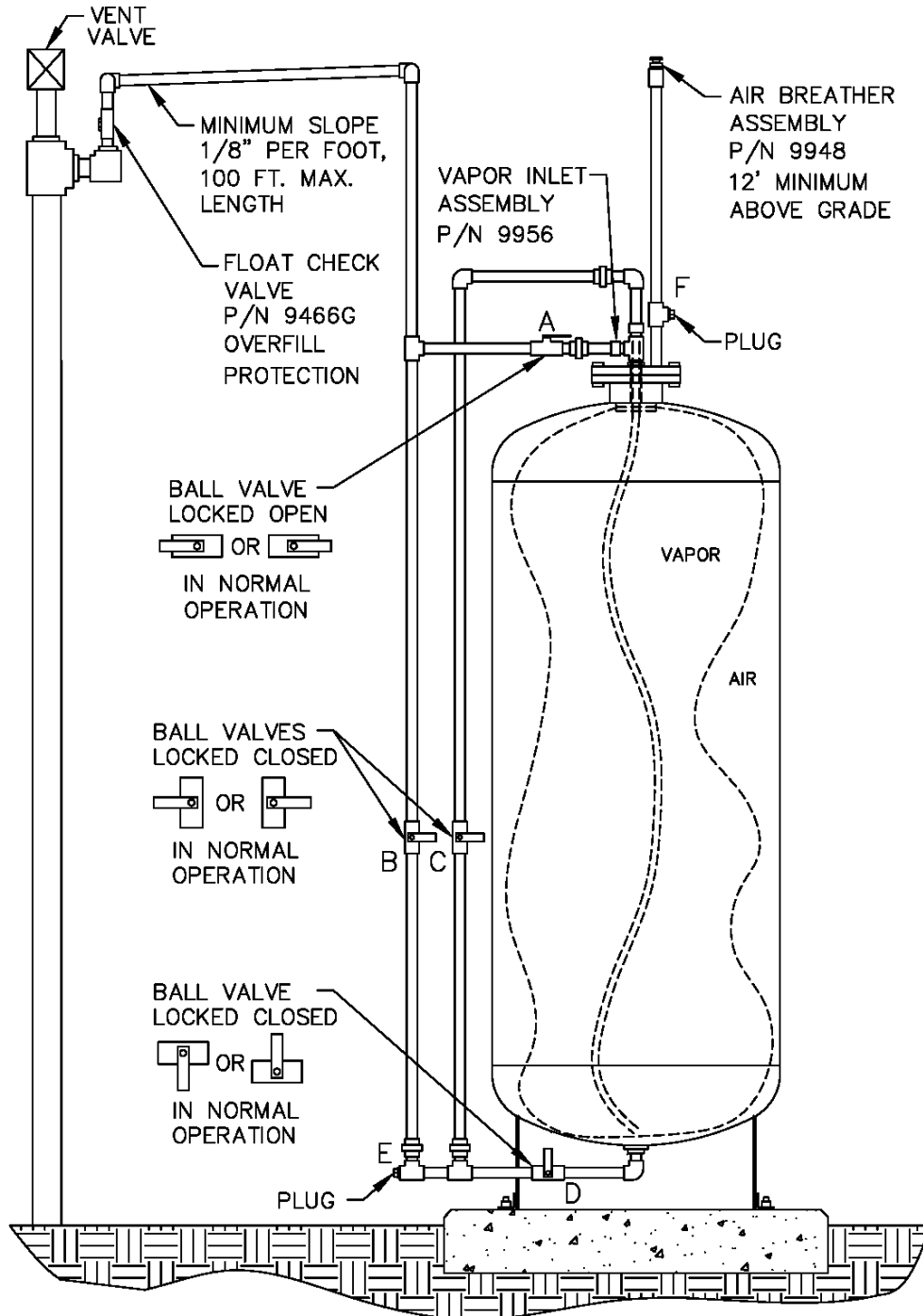
**Typical Installation of a Three P/V Vent Valve Parallel Manifold  
with Healy Clean Air Separator**

(This configuration requires additional P/V vent valves that are not supplied in the Healy installation kit)



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-9  
Typical Configuration of a P/V Vent Valve Mounted on a  
Single 3" Vent Line with the Clean Air Separator**



**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-10  
Example of a GDF Maintenance Record**

<b>Date of Maintenance/ Test/Inspection/Failure (including date and time of maintenance call)</b>	<b>Repair Date To Correct Test Failure</b>	<b>Maintenance/Test/Inspection Performed and Outcome</b>	<b>Affiliation</b>	<b>Name of Individual Conducting Maintenance or Test</b>	<b>Telephone Number</b>

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 2  
Figure 2B-11  
Healy Systems Scheduled Maintenance**

**1.0 Scheduled Maintenance Instructions for a Healy Systems with VP1000 Vacuum Source and 900 Series EVR Nozzle.**

By design, the Healy System requires limited maintenance. Initial problems are usually caused by installation irregularities that are easily detected and repaired by performing the "VP1000 Vacuum Performance Test Procedure" located in the dispenser installation manual. Periodic maintenance described here will eliminate problems and maintain peak operation of the system.

**Note:** Only a Healy Certified Technician can service any problems discovered while conducting the Weekly or Quarterly Inspection and Testing.

**1.1 Weekly Inspection and Testing**

- Inspect each nozzle, hose, and breakaway for damage, loose connections, or leaks. Inspect nozzles for damaged vapor boots or spouts. Any nozzle with a vapor collection boot which is missing, or which has one half of the mini-boot faceplate or greater missing should be replaced or repaired as soon as practicable. Spouts with visible damage must be replaced.
- Inspect hoses for wear, severe kinks, cracks, and splitting. Replace if wire braid is visible.
- Test the VP1000 Vacuum Pump for normal operation using the following test procedure:
  - Normal operation will have the VP1000 Vacuum Pump running at low speed if only one side of a dispenser / pump is activated (ready to dispense fuel) and will run at full speed if both sides of the dispenser are activated (ready to dispense fuel). The VP1000 vacuum pump may continue to run for a few seconds after a nozzle is reholstered.

**NOTE:** If any of the four bullets below cannot be achieved, tag out dispenser and call a Healy Certified Technician for service.

- The VP1000 vacuum pump should come on immediately when a nozzle is lifted and the dispenser is activated and ready to dispense fuel.
- Repeat for each nozzle on both sides of the dispenser being tested, one at a time, to verify the VP1000 vacuum pump is

running after the dispenser is activated and ready to dispense fuel.

- Leave one nozzle activated on the first side and with the pump running, lift a nozzle on the other side of the dispenser (activated as above) and listen for a change of speed (increase) in the pump motor. Return both nozzles to the dispenser.
- Repeat the above procedures to activate both sides of the dispenser, but start with the opposite side of the dispenser. If the above procedures can be confirmed by starting with the opposite side of the dispenser, the VP1000 vacuum pump is correctly installed. After the VP1000 vacuum pump gets to second speed, it will not drop back to single speed until one nozzle is reholstered.
- **In parts of the country where the outside temperature drops below 35° F, the VP1000 vacuum pump motor will automatically run at a very low RPM to prevent freezing. This is normal operation.**

## 1.2 Quarterly Inspection and Testing

- 1.2.1 Perform Weekly Inspection prior to Quarterly inspection.
- 1.2.2 Inspect the VP1000 vacuum pump for loose or damaged vapor line connections. If copper tubing is kinked or loose tag out dispenser and call a Healy Certified Technician for service.
- 1.2.3 Check product dispensing flow rate at maximum (handheld) dispensing position. Replace dispenser filters when flow rate is below 6.5 gpm. If flow rates exceed 10 gpm, install Healy 1301 Flow Limiter. Verify flow rate is 10 gpm or less.
- 1.2.4 Check Clean Air Separator for proper operating configuration. See EO VR-201-A, Exhibit 2, Figure 2B-5A for guidance.

## 1.3 Annual Inspection and Testing to Be Performed By a Healy Certified Technician

The following procedures are recommended to be conducted in the order listed.

- 1.3.1 Perform weekly and quarterly inspection prior to Annual Inspection.
- 1.3.2 Conduct static pressure performance of the Healy Clean Air Separator. EO VR-201-A, Exhibit 4.
- 1.3.3 Conduct pressure decay test. TP 201.3 and EO VR-201-A, Exhibit 8.
- 1.3.4 Conduct dispenser vapor line tightness test found in the Healy dispenser manual under “testing the system” for each dispenser at GDF. Repair all leaks.



- 1.3.5 Conduct V/L test on all nozzles. EO VR-201-A, Exhibit 5. Adjust and replace as necessary.

#### 1.4 Procedure for Reconnecting Breakaway and Testing Fueling Point after Drive-Off.

**Note: The following procedure does not require a Healy Certified Technician. If any of the tests listed requires removing the fueling point or dispenser from service, contact a Healy Certified Technician. Breakaway reconnections and/or service by a Healy Certified Technician shall be logged in the GDF Maintenance Log.**

- 1.4.1 After a Drive-Off, inspect the nozzle, hose and breakaway for damage. Spouts with visible damage must be replaced. Hoses with wire braid showing must be replaced.
- 1.4.2 Reconnect the breakaway assembly per the procedure in the Reconnectable Breakaway Coupling (P/N 8701VV) section of the ARB Approved Installation, Operation and Maintenance Manual of the Healy Phase II EVR System Not Including ISD. This procedure requires the use of the Healy reconnection clamp, P/N 795. Verify that the tip of the shear screw installed prior to the Drive-Off is removed from the dispenser end body (connected to the whip hose) of the breakaway.

**Note: Do not remove the hose or nozzle from the bottom section of the breakaway, as the breakaway is holding the liquid gasoline in the hose/nozzle.**

- 1.4.3 Authorize dispenser and inspect the hanging hardware for liquid leaks and meter creep (fueling position display is counting up without dispensing product). If no liquid leaks or meter creep are observed, proceed to section 1.4.4 of this procedure. If liquid leaks or meter creep are observed, remove the fueling point from service and conducting the following:
  - 1.4.3.1 Use the breakaway reconnection procedure, referenced in section 1.4.2, in reverse order to disconnect the breakaway. Remove the nozzle and hose from the dispenser. (A towel can be placed into the upper portion of the nozzle holster of the dispenser to stop the dispenser beep associated with the nozzle being removed from the holster).
  - 1.4.3.2 Install a plastic bag around the portion of the breakaway still connected to the dispenser whip hose. The plastic bag shall be large enough to enclose the breakaway and shall have a thickness of no greater than 2 mils. In California, 12" x 20" x 2 mil thick bags are available from the Air Resources Board by calling (800) 952-5588.
  - 1.4.3.3 Initialize the dispenser for fueling. **Do not dispense any fuel.**

- 1.4.3.4 With the dispenser initialized, observe the bagged breakaway for a half a minute.
- 1.4.3.5 If the bag collapses (indicating the breakaway is not maintaining vapor integrity), or liquid leaks or meter creep are observed, remove the dispenser from service. If the bag does not collapse (indicating the breakaway is maintaining vapor integrity) and no liquid leaks or meter creep are observed, the dispenser can remain in service.
- 1.4.4 Conduct the Nozzle Bag Test using the procedure from Exhibit 7 of Executive Order VR-201-A. If the bag around the nozzle does not collapse, proceed to section 1.4.5 of this procedure. A nozzle where the bag is collapsing indicates a defective vapor valve. If the nozzle bag test indicates a defective vapor valve, remove the fueling point from service and conduct the following:
  - 1.4.4.1 Use the breakaway reconnection procedure, referenced in section 1.4.2, in reverse order to disconnect the breakaway. Remove the nozzle and hose from the dispenser. (A towel can be placed into the upper portion of the nozzle holster of the dispenser to stop the dispenser beep associated with the nozzle being removed from the holster).
  - 1.4.4.2 Install a plastic bag around the portion of the breakaway still connected to the dispenser whip hose. The plastic bag shall be large enough to enclose the breakaway and shall have a thickness of no greater than 2 mils. In California, 12" x 20" x 2 mil thick bags are available from the Air Resources Board by calling (800) 952-5588.
  - 1.4.4.3 Initialize the dispenser for fueling. **Do not dispense any fuel.**
  - 1.4.4.4 With the dispenser initialized, observe the bagged breakaway for a half a minute.
  - 1.4.4.5 If the bag collapses (indicating the breakaway is not maintaining vapor integrity), or liquid leaks or meter creep are observed, remove the dispenser from service. If the bag does not collapse (indicating the breakaway is maintaining vapor integrity) and no liquid leaks or meter creep are observed, the dispenser can remain in service.
- 1.4.5 The following tests shall be performed after passing sections 1.4.3 and 1.4.4 of this procedure.
  - 1.4.5.1 Test the insertion interlock feature of the nozzle using the procedures outlined in Sections 1.1.7 and 1.1.8 in the Healy Model 900 Nozzle section of the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR

System Not Including ISD. If the nozzle fails either of these tests, remove the fueling point from service.

- 1.4.5.2 Test the automatic shutoff feature of the nozzle using the procedures outlined in Sections 1.2.8, 1.2.9 and 1.2.10 in the Healy Model 900 Nozzle section of the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD. If the nozzle fails any of the tests, remove the fueling point from service.

For more information about testing and /or maintenance of Healy products, contact Healy Technical Services @ (603) 882-2472.

## HEALY PHASE II EVR SYSTEM LIMITED WARRANTY

Healy Systems Inc., products are warranted for workmanship, performance, and materials when properly installed, used and maintained using the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD. All Healy products, subassemblies, and raw materials are fully inspected and tested at the manufacturing facility. Healy warrants the workmanship and materials to be free of defects for a period in accordance with the provisions stated below:

- The equipment has been installed according to the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD.
- The nearest Healy Certified Technician qualified to perform service on the defective equipment must perform warranty service. Only Healy Certified Technicians are allowed to perform warranty service. Use of service personnel other than qualified Healy Certified Technicians without prior written approval by Healy Systems Inc. will void the warranty.
- Claims for warranty repair or replacement service must have a written "Returned Material Authorization" (RMA) from Healy Systems, and must be shipped freight prepaid to Healy Systems for inspection.
- Healy Systems Inc., upon inspection at its facilities, and after determination of a warranty claim, will, at its option, repair or replace defective parts returned to its factory. Repaired or replaced parts will be returned freight prepaid by Healy Systems.
- Healy Systems is not responsible for labor or materials necessary to disconnect or connect the warranted product for return to Healy.
- Healy reserves the right to make changes in the design or to make additions or improvements with respect to its products without incurring any obligation to modify or install same on previously manufactured products, upon written ARB approval.
- Healy warrants the workmanship and materials of the following products to be free of defects for a period of fourteen months from the date of shipment from Healy: Inverted coaxial hoses, Hose adapters, Flow limiters and Breakaways.
- EVR Nozzles 900 Series – New & Rebuilt: Healy warrants the workmanship and materials to be free of defects for a period of fourteen months from the date of shipment from Healy. Exclusions: This warranty excludes the field replaceable "rubber/plastic" parts at the front of the nozzle (i.e., boot, scuffguard, face seal assembly, etc.) or the spout or parts that have been subjected to misuse, handling or incorrect installation.
- Vacuum Pump – VP1000: Healy warrants the workmanship and materials to be free of defects for a period of twenty-six months from the date of shipment from Healy. This applies to the vacuum pump and motor assembly only. The Hardware Kits, Vapor Kits, Electrical Kits and Interface modules are warranted for workmanship and materials to be free of defects for a period of fourteen months from the date of shipment from Healy.
- Clean Air Separator - Healy warrants the workmanship and materials to be free of defects for a period of 122 months from the date of shipment from Healy except for the Lockable ball valves, Locks, Master key, Float check valve and P/V Vent valve shipped with installation kit, which are warranted for fourteen months from the date of shipment from Healy.
- General Exclusions: This warranty shall not apply to any product which has been altered in any way, which has been repaired by any party other than Healy Certified Technicians, or when such failure is due to misuse or conditions of use. Use of non-Healy replacement parts, the unauthorized addition of non-

Healy items to Healy equipment, and the unauthorized alteration of Healy equipment void this warranty. Healy shall, as to each defect, be relieved of all obligations and liabilities under a components warranty if the vapor recovery system or components shall have been operated with any accessory, equipment, or a part not specifically approved by Healy and not manufactured by Healy to Healy's design and specifications. Healy Systems makes no warranty with respect to the Healy performance of equipment or Healy's performance of services under this agreement, express or implied, and Healy Systems hereby disclaims the implied warranties of merchantability and fitness for a particular purpose.

- This warranty shall not cover any Healy System components that have been in contact with fuels containing greater than 15% methanol, 15% ethanol, or 15% MTBE by volume. Any component(s), which is exposed to M85/E85 fuel (or other alcohol-rich fuel), is not covered under the Healy Systems warranty. This warranty is a limited warranty. Anything in the warranty notwithstanding, implied warranties for fitness, particular purpose and merchantability shall be limited to the duration of the express warranty. Healy Systems expressly disclaims and excludes any liability for consequential or incidental damage for breach of any express or implied warranty.

## **Healy...Specializing in Stage II Vapor Recovery Technology**

*In keeping with California Air Resources Board requirements that were adopted by the state in which this equipment is installed, this manual must be left on-site with facility management and it must be available for use at all times.*

Site Name:	
Address:	
Date Installed:	
Installing Contractor:	
Service Contact:	
Service Telephone:	

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 3**

**Manufacturing Performance Standards and Specifications**

The Healy Phase II EVR System Not Including ISD and all components shall be manufactured in compliance with the performance standards and specifications in CP-201 (amended July 22, 2004), as well as the requirements specified in this Executive Order. All components (Exhibit 1) shall be manufactured as certified; no change to the equipment, parts, design, materials or manufacturing process shall be made unless approved in writing by the Executive Officer or Executive Officer delegate. Unless specified in Exhibit 2 or in the ***ARB Approved Installation, Operation and Maintenance Manual for the Healy EVR System Not Including ISD***, the requirements of this section apply to the manufacturing process and are not appropriate for determining the compliance status of a gasoline dispensing facility.

**1. NOZZLES**

Each nozzle shall be 100 percent performance tested at the factory. Each nozzle shall have affixed to it a card or label stating the performance specifications listed below, and a statement that the nozzle was tested to, and met, the following specifications.

- a. The nozzle vapor valve leak rate shall not exceed 0.038 cubic feet per hour (CFH) at a pressure of +2 inches H<sub>2</sub>O when tested in accordance with the latest version of TP-201.2B.
- b. The nozzle vapor valve leak rate shall not exceed 0.10 CFH at a vacuum of -100 inches H<sub>2</sub>O when tested in accordance with the latest version of TP-201.2B.
- c. The nozzle automatic shut off feature is tested 100% at all three full service clip settings as well as handheld in accordance with Under Writers Laboratories (UL) Standard 842.
- d. The nozzle is 100% tested in accordance with the California Department of Food and Agriculture Division of Measurement Standards Article 2 (DMS 6-6-97).

- e. The nozzle is manufactured to the specifications that passed all tests conducted during the ARB certification for the following:
  - TP-201.2C - Spillage from Phase II Systems
  - TP-201.2D - Post Fueling Drips From Nozzles
  - TP-201.2E - Gasoline Liquid Retention in Nozzles and Hoses
- f. The nozzle is manufactured to meet the Vapor to Liquid Ratio as specified in Exhibit 2.
- g. The terminal end of each nozzle shall be manufactured in accordance with the specifications referenced in Section 4.7.3 of CP-201.

## **2. INVERTED COAXIAL HOSES**

- a. The inverted coaxial hoses are 100% tested for continuity and pressure tests in accordance with UL Standard 330.

## **3. HOSE ADAPTERS**

- a. The hose adaptors are 100% tested for continuity and pressure tests in accordance with UL Standard 567.

## **4. RECONNECTABLE BREAKAWAY COUPLINGS**

- a. The reconnectable breakaway couplings are 100% tested for continuity and pressure tests in accordance with UL Standard 567.

## **5. FLOW LIMITER**

- a. The flow limiters are 100% tested to 50 pounds per square inch (psi) liquid pressure to verify maximum gasoline flow rate limited to 10 gpm.

## **6. VP1000 VACUUM PUMPS**

- a. The vacuum pump is 100% pressure tested in accordance with UL Standard 79.
- b. The VP1000 vacuum pump is manufactured to the exact specifications that passed all tests conducted during the ARB certification.
- c. The MC100 control module is 100% tested in the factory to verify proper operation.



## **7. TANK PRESSURE MANAGEMENT SYSTEM**

- a. The Clean Air Separator tank is designed, constructed, tested, inspected and stamped per the American Society of Mechanical Engineers (ASME) Code Section VIII, Division 1, 2001 Edition, 2003 Addendum.
- b. The Clean Air Separator bladder is 100% performance and pressure tested to ensure its integrity.

## **8. PRESSURE/VACUUM (P/V) VENT VALVES FOR UST VENT PIPES**

- a. Each P/V vent valve shall be 100 percent performance tested at the factory for cracking pressure and leak rate at each specified pressure setting and shall be done in accordance with TP-201.1E, *Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves*. Each P/V vent valve shall be shipped with a card or label stating the performance specifications listed below, and a statement that the valve was tested to, and met, these specifications.
  - 1. The pressure settings for the P/V vent valve
    - Positive pressure setting of  $3.0 \pm 0.5$  inches H<sub>2</sub>O.
    - Negative pressure setting of  $-8.0 \pm 2.0$  inches H<sub>2</sub>O.
  - 2. The leak rate for each P/V vent valve, including connections, shall not exceed:
    - 0.05 CFH at 2.0 inches H<sub>2</sub>O.
    - 0.21 CFH at  $-4.00$  inches H<sub>2</sub>O.
- b. Each P/V vent valve shall have permanently affixed to it a yellow or gold label with black lettering listing the positive and negative pressure settings specified above. The lettering of the label shall be a minimum font size of 20.

California Environmental Protection Agency

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## **Vapor Recovery Test Procedure**

### **Exhibit 4**

Determination of Static Pressure  
Performance of the Healy Clean Air Separator

**California Environmental Protection Agency  
Air Resources Board  
Vapor Recovery Test Procedure**

**Exhibit 4**

**Determination of Static Pressure  
Performance of the Healy Clean Air Separator**

**1 APPLICABILITY**

Definitions common to all certification and test procedures are in:

**D-200 Definitions for Vapor Recovery Procedures**

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

- 1.1 This test procedure is used to quantify the vapor tightness of the Healy Clean Air Separator tank pressure management system installed as part of the Healy Phase II EVR System Not Including ISD at a gasoline dispensing facility (GDF).

**2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE**

- 2.1 The Clean Air Separator, while isolated from the vapor recovery system, is evaluated for vapor integrity using a vacuum decay procedure. The vacuum decay after 5 minutes is compared with an allowable value. The allowable value is based upon the initial vacuum level when conducting the test using the table provided in this test procedure.
- 2.2 A positive pressure decay procedure is included that conducts the same evaluation as the vacuum decay but with positive pressure. This test is conducted if there is insufficient vacuum (not greater than – 2.00" wc) to conduct the vacuum decay. Districts have the authority to specify in the permit conditions that this positive pressure procedure is to be conducted even if the vacuum test has been conducted.

**3 RANGE**

- 3.1 The full-scale range of the electronic measuring device shall not exceed 0-20.00" wc with a minimum accuracy of not less than 0.25 percent of full-scale.
- 3.2 If necessary, the minimum and maximum nitrogen feed-rates, into the system,

shall be two (2) and four (4) CFM, respectively.

#### **4 INTERFERENCES**

- 4.1 Leaks in the piping for the Clean Air Separator could bias the test results toward non-compliance.
- 4.2 Introduction of gaseous nitrogen into the system at flow rates exceeding four (4) CFM may bias the results of the test toward non-compliance. Only gaseous nitrogen shall be used to conduct this test.
- 4.3 Pressurizing the Clean Air Separator bladder greater than 10.00" wc could damage the bladder, biasing the test toward non-compliance.
- 4.4 When conducting the positive pressure test from this test procedure (Referred to in Section 2.2), bladder contact with the outer tank wall of the Clean Air Separator could bias the results toward compliance.
- 4.5 Thermal Bias for Electronic Manometers

Electronic manometers shall have a warm-up period of at least 15 minutes followed by a drift check of 5 minutes. If the drift exceeds 0.01" wc, the instrument should not be used.

#### **5 APPARATUS**

##### **5.1 Nitrogen**

Use commercial grade gaseous nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator.

##### **5.2 Pressure Measurement Device**

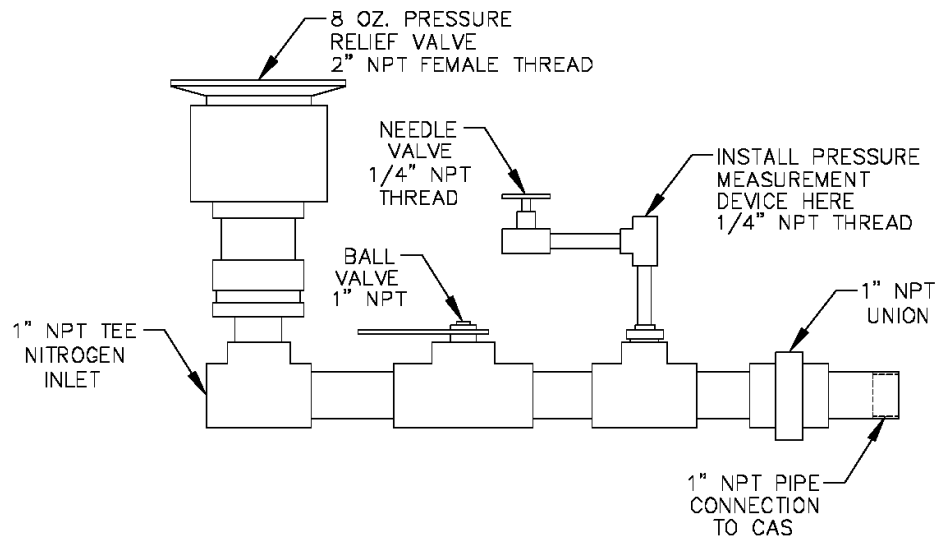
Use an electronic pressure measurement device to monitor the pressure decay in the Clean Air Separator. The pressure measurement device shall, at a minimum, be readable to the nearest 0.01" wc.

##### **5.3 Test Port Assembly**

Use a test port assembly constructed similar to the one in Figure A. The assembly should have an 8 oz. Pressure Relief valve, to ensure that the Clean Air Separator is not over pressurized. The Model 9968 Clean Air Separator Test Port Assembly can be purchased from Healy Systems, Inc.

Figure A

Clean Air Separator Test Port Assembly



#### 5.4 Stopwatch

Use a stopwatch accurate to within 0.2 seconds.

#### 5.5 Flow Meter

Use a Dwyer flow meter, Model RMC-104, or equivalent, to determine the required pressure setting of the delivery pressure gauge on the nitrogen supply pressure regulator. This pressure shall be set such that the nitrogen flow rate is between 2.0 and 4.0 CFM.

#### 5.6 Leak Detection Solution

Any liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of the test equipment prior to conducting the test.

### **6 PRE-TEST PROCEDURES**

#### 6.1 The following safety precautions shall be followed:

6.1.1 Only gaseous nitrogen shall be used to pressurize the system.

6.1.2 An 8 oz. pressure relieve valve shall be installed on the Test Port Assembly to prevent the possible over-pressurizing of the Clean Air Separator.

6.1.3 A ground strap should be employed during the introduction of nitrogen into the system.

6.2 There shall be no Phase I bulk product deliveries into or out of the storage tank(s) within the three (3) hours prior to the test or during the performance of this test procedure.

6.3 All pressure measuring device(s) shall be bench calibrated using a reference standard. Calibration shall be performed at 20, 50, and 80 percent of full scale. Accuracy shall be within two percent at each of these calibration points. Calibrations shall be conducted on a frequency not to exceed 180 days. Calibration documentation shall be maintained with the equipment at all times.

6.4 Use the flow meter to determine the nitrogen regulator delivery pressures that correspond to nitrogen flow rates of 2.0 and 4.0 CFM. These pressures define the allowable range of delivery pressures acceptable for this test procedure. The flow meter may be connected in-line between the nitrogen supply regulator and the Test Port Assembly during the test.

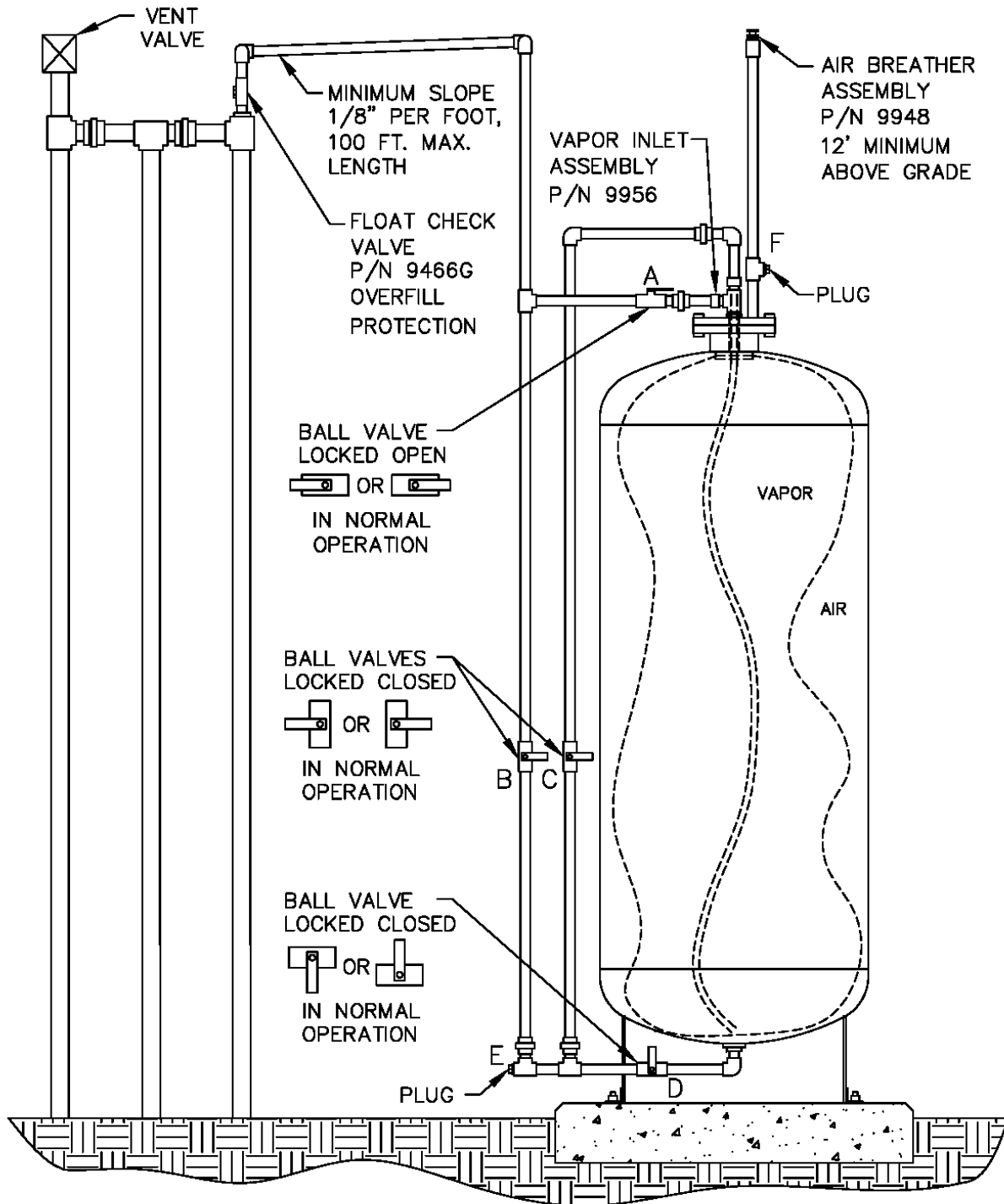
6.5 The electronic pressure measurement device shall be subject to warm-up and drift check before use; see Section 4.5.

- 6.6 The four ball valves used in the installation of the Clean Air Separator are lockable and shall be locked in the position shown in Figure 2B-5 of Exhibit 2 during normal operation. The four padlocks provided by Healy Systems, Inc. in their installation kit are keyed the same. However, it is possible that one or more of the padlocks on the Clean Air Separator could have been replaced (seizing, damage, broken key, etc.). Conducting this test will require a set of keys necessary to unlock all padlocks.
- 6.7 Verify that the Clean Air Separator is in its normal operating configuration by confirming that all components are as indicated (See Figure 1 below):

Valve "A" - Open  
Valve "B, C and D" - Closed  
Pipe End "E" - Plugged  
Tee Branch "F" - Plugged

Figure 1

Normal Clean Air Separator Operating Configuration



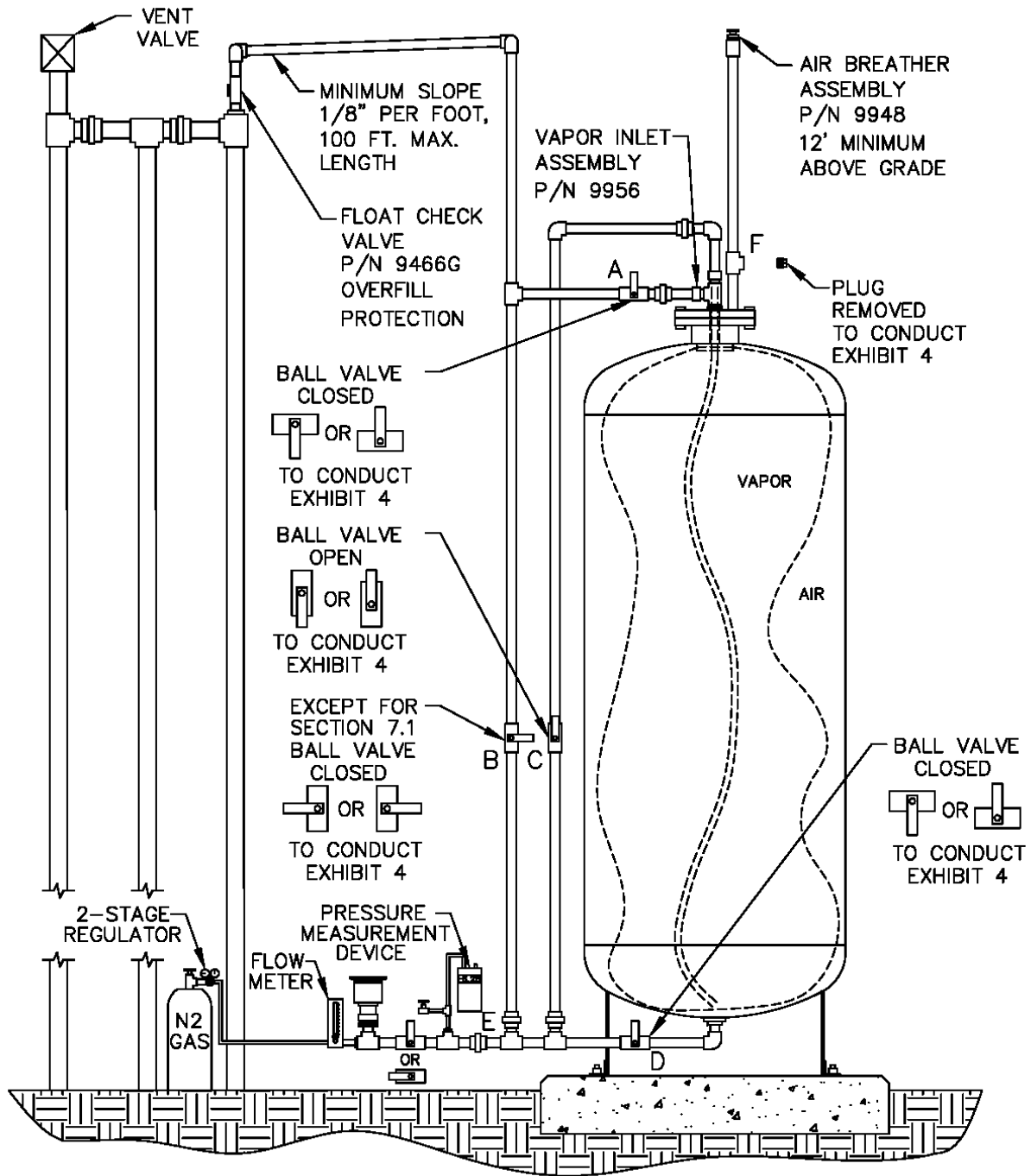


## 6.8 Installing the Test Port Assembly

- 6.8.1 Remove the 1" plugs from locations "E" and "F" from Figure 1. If there is more than 16 oz. of liquid condensate, the bladder and tank must be drained. Conduct the bladder and tank draining procedures from the Clean Air Separator section of the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD.
- 6.8.2 Install the Test Port Assembly to the Clean Air Separator at location "E". See Figure 2.
- 6.8.3 Connect the gaseous nitrogen supply to the Test Port Assembly. See Figure 2.
- 6.8.4 Check the test equipment and piping isolated from normal Clean Air Separator operation by the ball valves "B, C and D" by pressurizing with nitrogen and closing the ball valve on the Test Port Assembly. Use leak detection solution. Tighten as necessary. The test equipment shall have no leaks.
- 6.8.5 Open the needle valve on the Test Port Assembly to bleed the pressure off the equipment. Keep ball valve on Test Port Assembly closed.

Figure 2

Clean Air Separator in Configuration to Conduct Test



## 7 TESTING

- 7.1 Open the ball valve marked “B” from Figure 2. The pressure measurement device installed on the Test Port Assembly should now be reading UST and Clean Air Separator ullage pressure (or vacuum).
- 7.2 If the station vacuum is greater than (more negative) than -2.00” wc, then proceed to Section 7.2.1. If less than -2.00” wc, then proceed to Section 7.3:
- 7.2.1 Close the ball valves marked “A” and “B” from Figure 2.
- 7.2.2 Open the ball valve marked “C” from Figure 2 and wait one minute.
- 7.2.3 If necessary, use the needle valve on the Test Port Assembly to bleed air into the bladder until the vacuum level reaches as close to a whole number on the pressure measurement device as the accuracy of the device will provide (ie. -2.00, -3.00, -4.00, -5.00, -6.00, -7.00, -8.00). Make sure the needle valve is closed. Record this vacuum and start the stop watch to begin a 5 minute decay.
- 7.2.4 Record the vacuum at one-minute increments up to 5 minutes.
- 7.2.5 Using the information from Table 1, verify that the vacuum after 5 minutes is equal to or greater than the allowable minimum for the initial vacuum recorded from Section 7.2.3.
- 7.2.6 If the vacuum is greater than the allowable minimum, the Clean Air Separator passed the test.
- 7.2.7 If the vacuum is less than the allowable minimum, the Clean Air Separator failed the test.

TABLE 1  
Allowable 5 Minute Vacuum Decay for Clean Air Separator

Vacuum at Start of Test (inches wc)	Allowable Minimum Vacuum after 5 min. (inches wc)
8.0	5.5
7.0	4.7
6.0	3.8
5.0	3.0
4.0	2.2
3.0	1.5
2.0	0.8

- 7.3 If the station vacuum is less than  $-2.00''$  wc (from Section 7.2), or at the direction of district (refer to Section 2.2), conduct the following:
  - 7.3.1 Close the ball valves marked “A” and “B” from Figure 2.
  - 7.3.2 Open the ball valve marked “C” from Figure 2.
  - 7.3.3 Open the ball valve of the Test Port Assembly and flow nitrogen into the Clean Air Separator bladder at a flow rate between 2 and 4 CFM until the pressure in the bladder reaches  $2.20''$  wc.
    - 7.3.3.1 Depending upon the nitrogen flow rate used, the bladder could take up to 30 minutes to fill completely.
    - 7.3.3.2 Because of the close proximity of the pressure measurement device to the nitrogen inlet of the Test Port Assembly, the pressure measurement device may read a higher pressure when nitrogen is flowing. The pressure measurement device is usually steady, but will start to increase rapidly when the bladder is getting full.
    - 7.3.3.3 Periodically stopping nitrogen flow will provide an accurate reading of the pressure in the bladder.
  - 7.3.4 Once the pressure reaches  $2.20''$  wc, shut off the flow of nitrogen to the Clean Air Separator bladder and close the ball valve of the Test Port Assembly.
  - 7.3.5 Wait 5 minutes or until pressure stabilizes.
  - 7.3.6 Use the needle valve on the Test Port Assembly to bleed off the nitrogen until the pressure reaches  $2.00''$  wc. Make sure the needle valve is closed. Record the pressure.
  - 7.3.7 Start the stop watch to begin a 5 minute decay.
  - 7.3.8 Record the pressure in one-minute increments up to 5 minutes.
  - 7.3.9 If the pressure in the bladder is greater than  $1.77''$  wc at the end of 5 minutes, then the Clean Air Separator passed the test.
  - 7.3.10 If the pressure in the bladder is less than  $1.77''$  wc at the end of 5 minutes, then the Clean Air Separator failed the test.
- 7.4 If the bladder was evaluated using the vacuum procedure (Section 7.2), close the ball valve “C” to keep it in a vacuum condition. If the bladder was evaluated using the pressure procedure (Section 7.3), open the needle valve on the Test

Port Assembly to bleed off all pressure from the bladder.

- 7.5 Close the ball valve marked “C”, if not already done.
- 7.6 Remove the Test Port Assembly from location “E” and install the 1” pipe plug. Use a pipe sealant approved for use with gasoline on the threads and tighten to 60 ft-lbs.
- 7.7 Install the 1” pipe plug to location “F”. Use a pipe sealant approved for use with gasoline on the threads and tighten to 60 ft-lbs.
- 7.8 Open the ball valve marked “A”. Lock all ball valves using the padlocks.
- 7.9 The Clean Air Separator should now be in normal operation configuration. Verify this by using the outline from Section 6.7 and Figure 1.

## **8 REPORTING**

- 8.1 Record test data on the form shown in Figure 3. Districts may require the use of an alternate form, provided that the alternate form includes the same minimum parameters as identified in Figure 3.

**Figure 3**  
**Data Form for Determination of Static Pressure Performance**  
**of the Healy Clean Air Separator**

SOURCE INFORMATION		
<p align="center">GDF Name and address</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p align="center">GDF Representative and title</p> <p>_____</p> <p>_____</p> <p>GDF Phone No. _____</p>	
<p>Date and Time of Last Fuel Drop to GDF: _____</p> <p>Date of Last Calibration of Pressure Measurement Device: _____</p>	<p>P/O #: _____</p> <p>A/C#: _____</p> <p>District Test Witness: _____</p>	
<p align="center"><b>VACUUM TEST (Section 7.1 through 7.2.7)</b></p> <p>Vacuum at start of test, inches water column (7.2.3) _____</p> <p>Vacuum at one minute, inches water column _____</p> <p>Vacuum at two minutes, inches water column _____</p> <p>Vacuum at three minutes, inches water column _____</p> <p>Vacuum at four minutes, inches water column _____</p> <p>Final vacuum at five minutes, inches water column _____</p> <p>Allowable minimum vacuum, inches water column (from Table 1) _____</p>		
<p align="center"><b>POSITIVE PRESSURE TEST (Section 7.3 through 7.3.9)</b></p> <p>Pressure at start of test, inches water column (7.3.6) _____</p> <p>Pressure at one minute, inches water column _____</p> <p>Pressure at two minutes, inches water column _____</p> <p>Pressure at three minutes, inches water column _____</p> <p>Pressure at four minutes, inches water column _____</p> <p>Final pressure at five minutes, inches water column _____</p> <p>Allowable final pressure, inches water column (7.3.9) <u>1.77</u></p>		
<p align="center">Test conducted by</p> <p>_____</p>	<p align="center">Test company</p> <p>_____</p>	<p align="center">Date of test</p> <p>_____</p>

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California Environmental Protection Agency

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## **Vapor Recovery Test Procedure**

### **Exhibit 5**

Vapor to Liquid Volume Ratio for  
Healy Phase II EVR System  
Not Including ISD



**California Environmental Protection Agency  
Air Resources Board**

**Vapor Recovery Test Procedure**

**Exhibit 5**

**Vapor to Liquid Volume Ratio for  
Healy Phase II EVR System  
Not Including ISD**

Definitions common to all certification and test procedures are in:

**D-200 Definitions for Vapor Recovery Procedures**

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer, or his or her authorized representative or designate.

**1. PURPOSE AND APPLICABILITY**

- 1.1** This test procedure is used to quantify the Vapor to Liquid (V/L) Volumetric Ratio of the Healy Phase II EVR System Not Including ISD installed at gasoline dispensing facilities (GDF). This procedure provides a method to determine compliance with the V/L requirements specified in the ARB Executive Order (EO) VR-201-A.

**2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE**

- 2.1** A tight fitting adaptor is placed on the spout of a dispensing nozzle. The adaptor, which isolates vapor flow to the nozzle vapor collection ports, is connected to a volume gas meter. Gasoline is dispensed through the nozzle and the volume of vapors drawn through the vapor collection boot by the Phase II system vacuum pump is measured. The volume of vapor is recorded and compared with the volume of gasoline dispensed to determine the V/L Volumetric Ratio.
- 2.2** The test is conducted with the pressure/vacuum (P/V) vent valve(s) on the storage tank vent pipes installed.
- 2.3** The test procedure requires no modifications to the GDF being evaluated.
- 2.4** The test procedure may be conducted on a fueling point on one side of the dispenser with the other side of the dispenser either authorized to dispense fuel (but not dispensing), or with the other side dispensing fuel into a vehicle or another portable test tank. Conducting the test this way will be evaluating

the V/L of the fueling point with the VP1000 vacuum pump running on its high speed setting.

### 3. BIASES AND INTERFERENCES

- 3.1 Nozzle spouts that are damaged such that the V/L adaptor cannot fit over the nozzle spout preclude the use of this test.
- 3.2 Refueling points not capable of achieving dispensing rates required for conducting the V/L test, as specified in Exhibit 2 of ARB Executive Order VR-201-A, preclude the use of this test for determining in-use compliance of certified systems.
- 3.3 Bagging, or otherwise sealing any nozzle associated with the vacuum pump serving the nozzle being tested, may bias the test results towards compliance. **The V/L test to verify compliance shall be conducted without “bagging” any of the nozzles served by a common vacuum device.**
- 3.5 If the nozzle being tested introduces liquid into the test equipment, the V/L of that nozzle shall be deemed a failure of the V/L standard.
- 3.6 Do not drain or remove liquid in either the vapor passage of the hoses or the dispenser vapor piping prior to performing the test. Draining of this liquid gasoline will bias the test toward compliance.
- 3.7 The O-ring in the V/L adaptor that is not properly lubricated may bias the results toward noncompliance. Refer to the V/L adaptor manufacturer's instructions in the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD for lubrication requirements.
- 3.8 Conducting V/L testing with an improperly conditioned portable test tank (not saturated with gasoline vapors) will bias the test results of the as found V/L of the fueling point. Refer to Section 6.6 for proper portable test tank conditioning.

### 4. SENSITIVITY, RANGE, AND PRECISION

- 4.1 The maximum rated capacity of the gas volume meter shall be at least 250 CFH and not greater than 3,000 CFH.
- 4.2 The minimum rated capacity of the gas volume meter shall be 25 CFH.
- 4.3 The minimum readability of the gas volume meter shall be 0.01 cubic feet.
- 4.4 Precision is  $\pm 5$  percent of the gas volume meter reading.

## 5. EQUIPMENT

**5.1A Vapor to Liquid Adaptor.** Only the Healy Systems, Inc. V/L Test Sleeve, Part No. 8034-1, can be used to conduct V/L testing on the Healy Phase II EVR System Not Including ISD. The nominal inside diameter of the flexible tubing shall be between 0.75 and 1.00 inches, and the maximum length of the tubing shall be 6 feet. Figure 1 shows the Healy V/L adaptor assembled on the 900 EVR nozzle.

**5.1B Surrogate Spout.** Only the Healy Systems, Inc. V/L Surrogate Spout Assembly, Part No. 8175-1, can be used to conduct the pre-test and post-test leak check. Figure 1 shows the Healy Surrogate Spout.

Figure 1 shows the Healy V/L adaptor assembled on the 900 EVR nozzle and the Surrogate Spout.

**5.2 Gas Volume Meter.** Use a gas volume meter to measure the volumetric flow rate through the V/L adaptor. The meter shall be equipped as shown in Figure 2 and the maximum allowable pressure drop(s) across the meter shall be:

For a meter with a maximum rated capacity of 1000 CFH through 3,000 CFH:

1.10 inches H<sub>2</sub>O at a flowrate of 3,000 CFH

0.05 inches H<sub>2</sub>O at a flowrate of 30 CFH

For a meter with a maximum rated capacity of 800 to 1,000 CFH:

0.70 inches H<sub>2</sub>O at a flowrate of 800 CFH

0.04 inches H<sub>2</sub>O at a flowrate of 16 CFH

**5.3 Volume Gas Meter Inlet Manifold.** This manifold is designed to return the vapors displaced from the portable gasoline tank assembly, at atmospheric pressure, to the inlet of the gas volume meter. This manifold shall be two (2.0) inches minimum inside diameter pipe. The intake passage of the manifold shall be no shorter than 6.0 inches and no longer than 18.0 inches. See Figures 2 and 4.



Figure 1

Healy Vapor To Liquid (V/L) Adaptor and Surrogate Spout Assembly

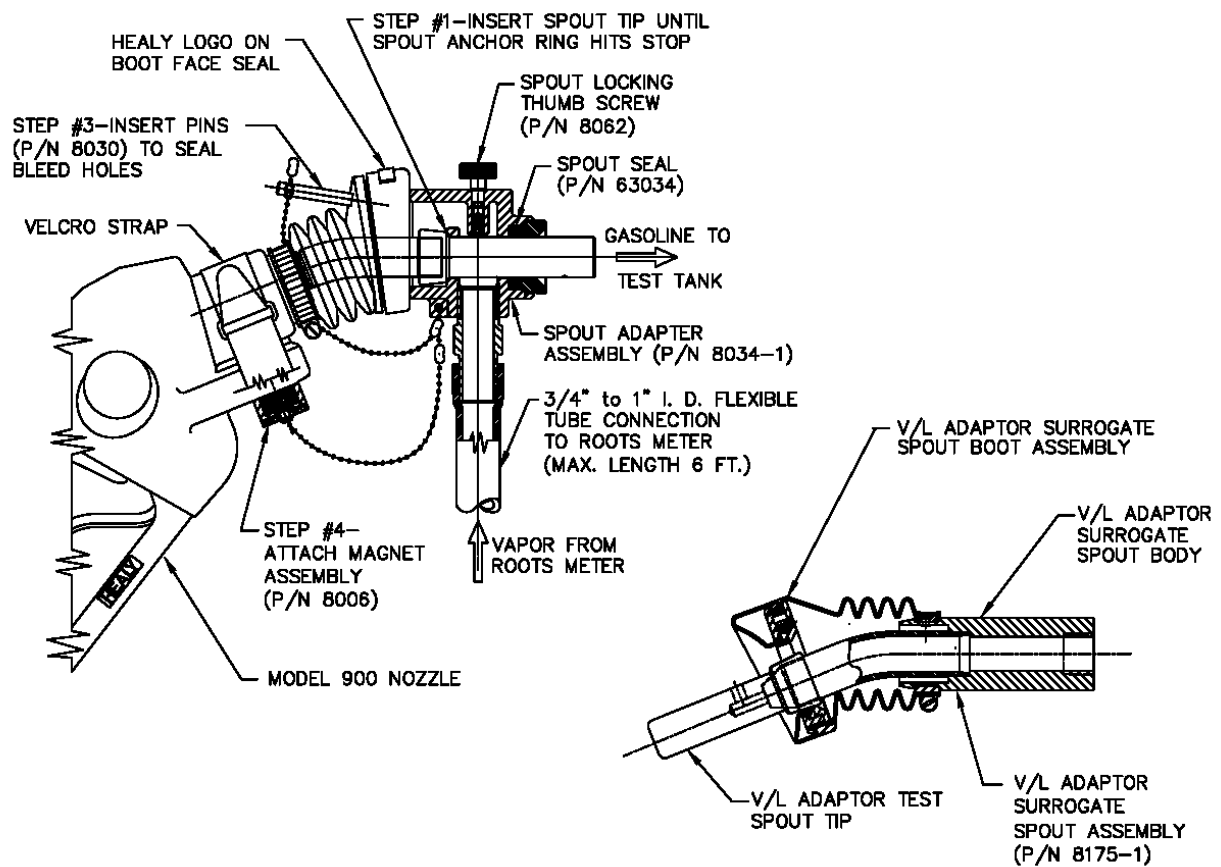
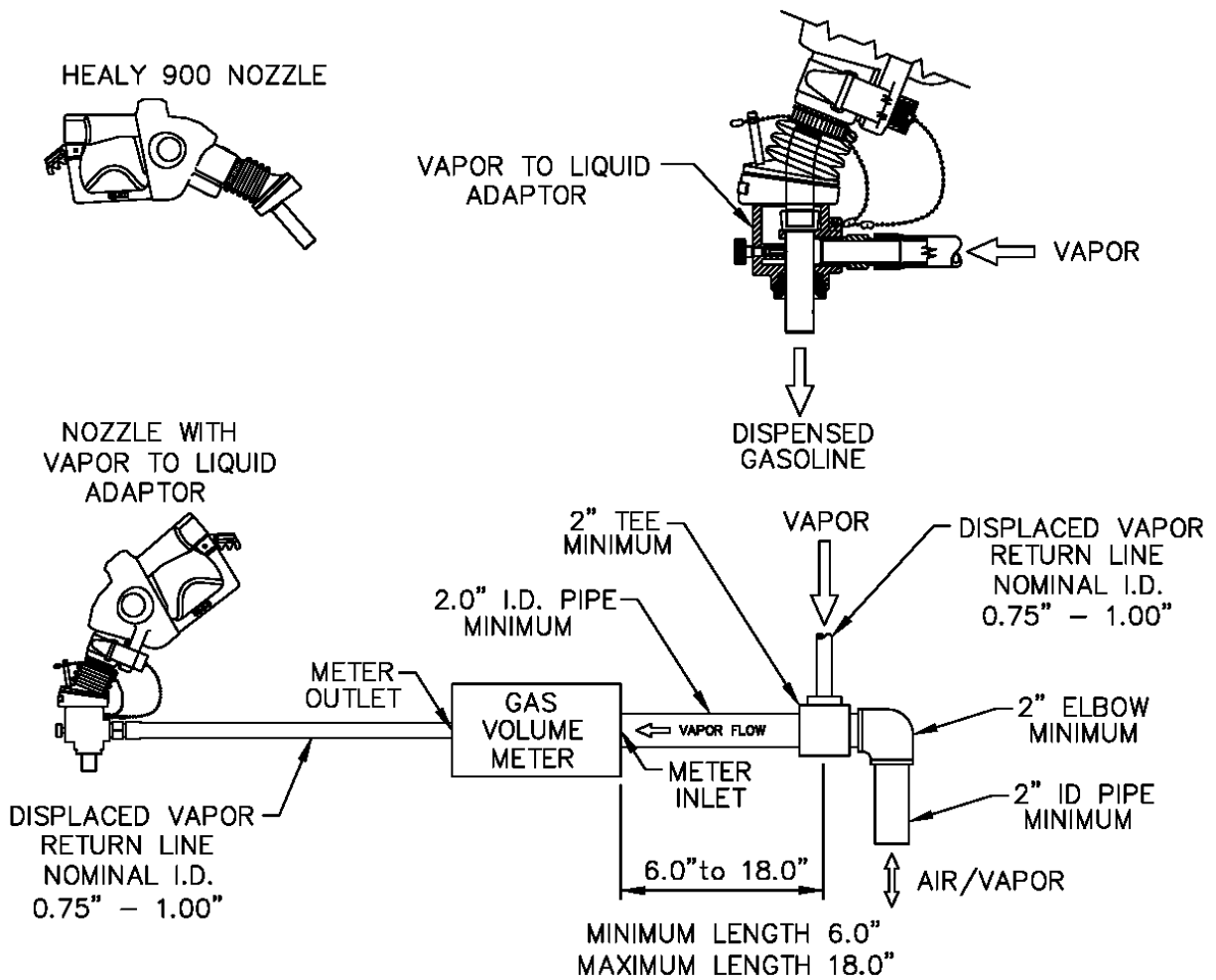


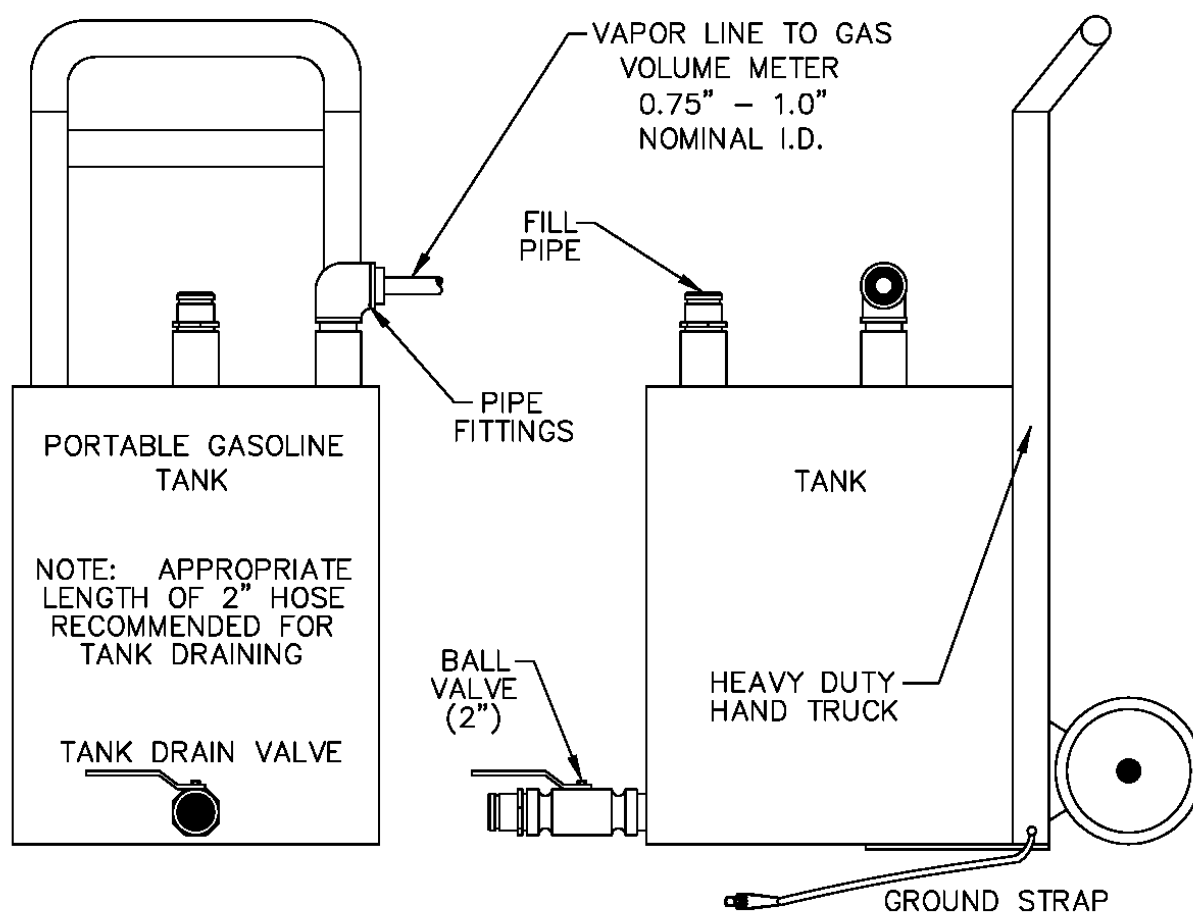
Figure 2

Gas Volume Meter and Vapor To Liquid Adaptor



- 5.4 Liquid Volume Meter.** Use the totalizer on the gasoline dispenser to measure the volume of gasoline dispensed during the test.
- 5.5 Portable Gasoline Tank Assembly.** A portable tank, meeting fire safety requirements for use with gasoline, shall be used to receive the gasoline dispensed during this test. The tank shall have sufficient volume so that at least 4.5 gallons may be dispensed prior to activating the primary shutoff mechanism of the dispensing nozzle. Tank material, likely to provide contact with the nozzle spout, or V/L adaptor, during the entire dispensing event, shall be constructed of aluminum or brass or other materials approved by the local fire codes for such application. The tank and required plumbing configuration is shown in Figure 3 and Figure 4. This configuration permits a portion of the vapors displaced during testing to be returned to the underground storage tank (UST). The minimum and maximum dimensions shown in Figure 2 and Figure 4 shall be adhered to in all cases.
- 5.6 Stopwatch.** Use a stopwatch accurate to within 0.2 seconds.
- 5.7 Lubricant.** Appropriate lubricant shall be used to ensure a leak-tight seal between the O-ring in the V/L adaptor and the nozzle spout.
- 5.8 Leak Detection Solution.** Any liquid solution designed to detect gaseous leaks may be used to verify the pressure integrity of test equipment during this test.

Figure 3  
Portable Tank Assembly





## 6. PRE-TEST PROCEDURES

- 6.1** Assemble the portable tank assembly and gas volume meter as shown in Figure 4. The minimum and maximum dimensions shown in Figure 4 shall be adhered to in all cases. **Ensure that the ground strap is properly connected to an acceptable ground.**

Note: A one-time test to verify proper design of the tee connection at the gas volume meter shall be conducted. Disconnect the V/L adaptor from the nozzle. Insert the nozzle into the portable test tank so that there is no visible gap between the nozzle boot/portable test tank fill pipe interface. Dispense between four and one-half and five (4.5 - 5.0) gallons into the portable test tank. The tee connection design passes the test if the displacement on the gas volume meter is less than 0.01 cubic feet. The result of this test shall be kept with the test equipment.

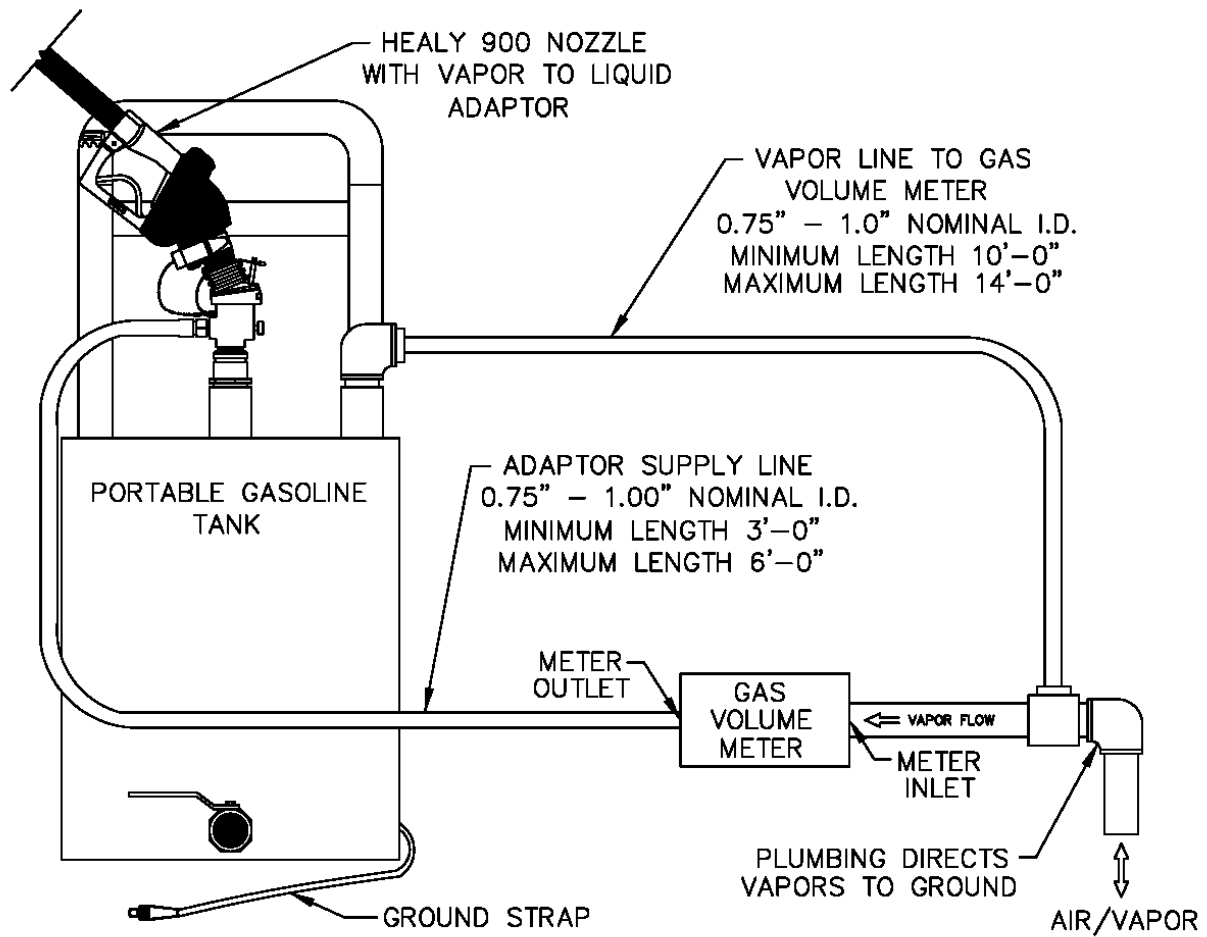
- 6.2** The gas volume meter shall be calibrated, within 180 days prior to conducting this procedure. In addition, calibration shall be conducted after any repairs or alterations to the meter. Calibrations, at a minimum, shall be conducted at flowrates of 30, 60, and 90 CFH (3.7, 7.5, and 11.2 gallons/minute) in accordance with one of the following:

- (a) ARB Air Monitoring Quality Assurance, Volume VI, Standard Operating Procedures for Stationary Source Emission Monitoring, January 1979, or
- (b) US EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, or
- (c) EPA Method 2A, Measurement of Gas Volume Through Pipes and Small Ducts (40 CFR Part 60, Appendix A), or
- (d) Appropriate calibration procedures in accordance with California Department of Food and Agriculture, Division of Measurement Standards and County Department of Weights and Measures (title 4, CCR, section 3.33).

A copy of the most current calibration shall be kept with the meter.

**Figure 4**

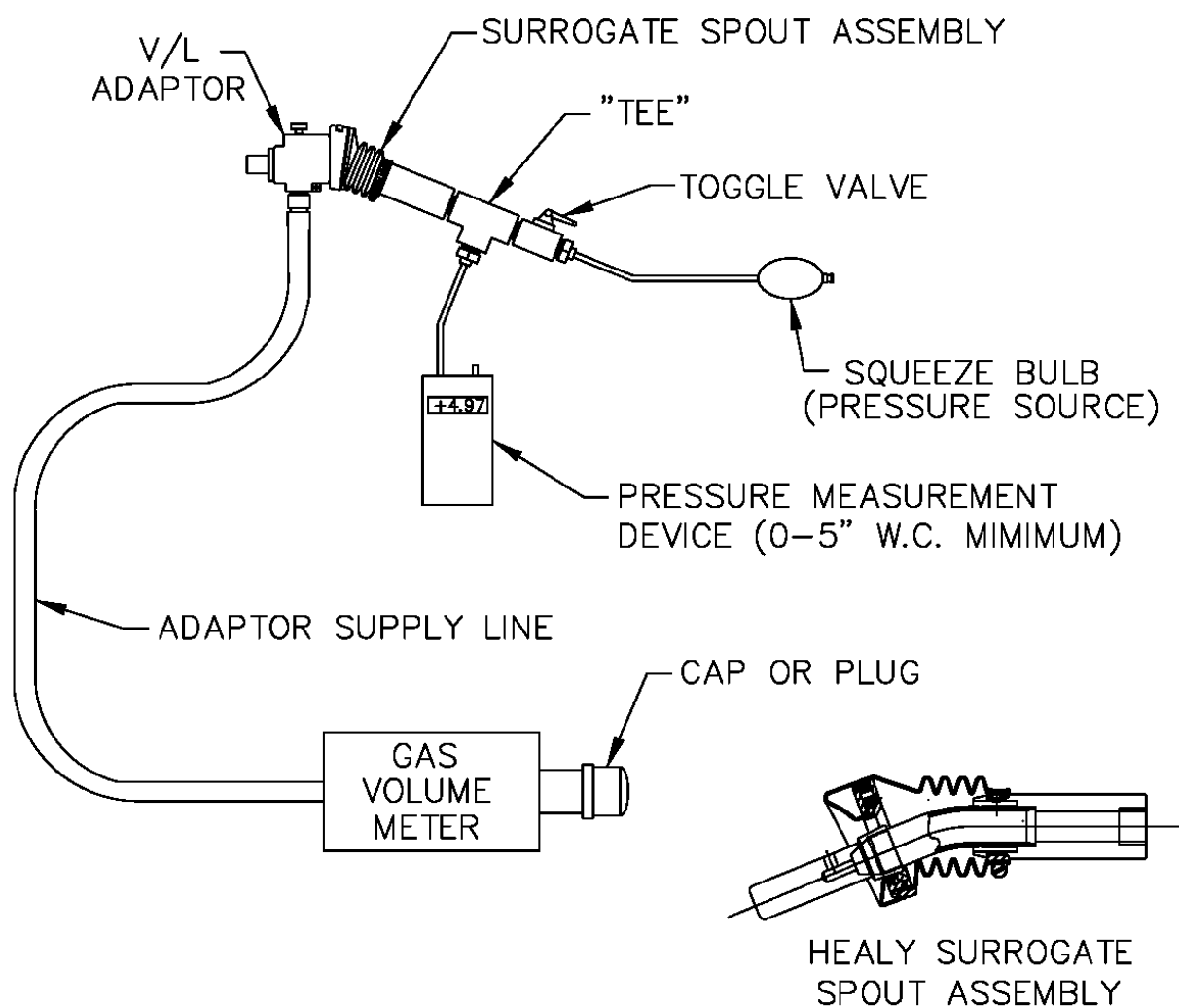
**Assembled Vapor to Liquid Volume Ratio Test Equipment**



- 6.3** Verify that the O-ring in the V/L adaptor is present and in good condition. An O-ring with nicks, tears, or other deformations shall be replaced prior to the test. The O-ring shall be properly lubricated to ensure a vapor tight connection. Refer to the V/L adaptor manufacturer's instructions in the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD for lubrication requirements.
- 6.4** Conduct a pre-test leak check of the V/L adaptor by connecting the V/L adaptor to a surrogate spout as shown in Figure 5. Raise the test pressure to five inches WC (5.00" WC). Squirt liquid leak detector solution on interfaces and other potential leak sources while watching for the formation of bubbles. There shall be no formation of bubbles, or a drop in pressure below 4.95" WC for three minutes from the start of the test.
- Note: Leak checks may be conducted during V/L testing to ensure leak integrity of test equipment.
- 6.5** This test procedure shall be conducted with the storage tank pressure/vacuum (P/V) valve(s) installed and the Phase I vapor coupler(s) poppet(s) in the closed position.
- 6.6** With the portable tank and V/L test equipment assembled, dispense gasoline into the portable test tank until at least 10% of the tanks total capacity has been reached. This will condition the portable tank with gasoline vapors. This conditioning shall be conducted each time the test tank is emptied prior to conducting testing at each facility.

Figure 5

Vapor To Liquid Adaptor and Gas Volume Meter Leak Test Assembly



## 7. TEST PROCEDURES

- 7.1 Carefully connect the V/L adaptor to the nozzle spout as shown in Figure 1, isolating the vapor path of the nozzle and ensuring a tight connection.
- 7.2 Record the initial reading from the index of the gas volume meter on the Healy V/L Field Data Sheet at the end of this document. This initial reading shall be taken before each test. Do not use the final reading from the preceding test as the initial reading for the current test, unless it has been verified. This is necessary since the meter index may have moved due to the low pressure drop through the meter.
- 7.3 Reset the stopwatch and, if appropriate, reset the totalizer on the dispenser.
- 7.4 Fully engage the nozzle trigger and begin dispensing into the portable gasoline tank. **Ensure that the nozzle spout is in contact with the grounded tank assembly during dispensing.** Start the stopwatch when the totalizer indicates dispensing has started.
- 7.5 Dispense between four and one-half (4.5) and five (5.0) gallons of gasoline.

If the nozzle being tested introduces liquid into the test equipment, the V/L of that nozzle shall be deemed a failure.

- 7.6 Simultaneously stop both the stopwatch and gasoline dispensing.
- 7.7 The following data for each test shall be recorded on the Healy V/L Field Data Sheet:
  - 7.7.1 Dispenser (pump) number
  - 7.7.2 Fuel grade
  - 7.7.3 Nozzle model and serial number
  - 7.7.4 Initial gas volume meter reading, in cubic feet
  - 7.7.5 Initial totalizer reading from the dispenser, in gallons
  - 7.7.6 Final gas volume meter reading, in cubic feet
  - 7.7.7 Final totalizer reading from the dispenser, in gallons
  - 7.7.8 Elapsed time during dispensing, in seconds

**Note:** Units other than cubic feet, gallons, and seconds may be used, provided that Equation 9-1 is appropriately modified.

- 7.8 If the V/L Volumetric Ratio, as determined by Equation 9-1 is between 0.95 –1.15, the grade point complies with the specifications.

- 7.9** If the V/L Volumetric Ratio is between 0.76 – 0.94, or greater than or equal to 1.16, conduct the test two additional times. Do not make adjustments to the gasoline dispensing or vapor recovery lines until all three test runs have been completed. Adjustments of the V/L test equipment, including the V/L adaptor and nozzle, are allowed as may be necessary to ensure measurement accuracy. If the V/L test equipment is adjusted, then the prior test run results for that grade point tested should not be used. Calculate the numerical average of the three test runs. If the average V/L value of these three test runs is within the allowable limits, compliance has been verified. If the resulting average is outside of the specified limits, the grade point tested does not comply with the specifications of the EO.
- 7.10** If the initial V/L Volumetric Ratio is less than or equal to 0.75, this indicates a V/L failure of the grade point tested.
- 7.11** To avoid a build-up of gasoline, drain any condensed gasoline, periodically or after each test run, from the hoses between:
- (a) the gas volume meter and portable tank assembly, and
  - (b) the V/L adaptor and gas volume meter.

## 8. POST-TEST PROCEDURES

- 8.1 Remove the V/L adaptor from the nozzle.
- 8.2 Drain the dispensed product into the appropriate gasoline storage tank at the facility. **Ground the portable tank assembly to the storage tank before draining.** Do not mix product grades in the portable tank assembly without approval of the facility owner and use caution to drain the portable tank into the correct facility storage tank. If blending valves are utilized to produce product grades that do not have a dedicated storage tank, product from the blended grade shall be returned to the lower octane tank.
- 8.3 After concluding testing at the facility, perform a post-test leak check of the V/L adaptor by connecting the V/L adaptor to a surrogate spout as shown in Figure 5. Raise the test pressure to five inches WC (5.00" WC). Squirt liquid leak detector solution on interfaces and other potential leak sources while watching for the formation of bubbles. There shall be no formation of bubbles, or a drop in pressure below 4.95" WC for three minutes from the start of the test. The data collected during the V/L testing between the last valid test equipment leak check (see Section 6.4) and the post-test leak check is invalid if the test equipment fails this post-test leak check.
- 8.4 Prior to transportation, the inlet and outlet of the gas volume meter shall be carefully sealed to prevent foreign matter from entering the meter.
- 8.5 The Authority Having Jurisdiction (AHJ) may be contacted on the requirements for storage and transportation of the portable test tank. This would typically be the local fire department.

## 9. CALCULATING RESULTS

**9.1** The V/L Volumetric Ratio shall be calculated as shown in Equation 9-1.

$$V / L = \left[ \frac{y(V_f - V_i)}{G_f - G_i} \right] \times 7.481 \quad \text{[Equation 9-1]}$$

Where:

V/L	=	Vapor to Liquid Volumetric Ratio, dimensionless
y	=	Correction factor for gas volume meter. See Equation 9-3
V <sub>i</sub>	=	Initial gas volume meter reading, cubic feet
V <sub>f</sub>	=	Final gas volume meter reading, cubic feet
G <sub>i</sub>	=	Initial totalizer reading from the dispenser, gallons
G <sub>f</sub>	=	Final totalizer reading from the dispenser, gallons
7.481	=	Conversion factor from gallons to cubic feet, gallons per cubic foot

**9.2** The gasoline dispensing rate during the V/L test shall be calculated as shown in Equation 9-2.

$$Q_g = \left[ \frac{G_f - G_i}{t} \right] \times 60 \quad \text{[Equation 9-2]}$$

Where:

Q <sub>g</sub>	=	Gasoline dispensing rate, gallons per minute
G <sub>i</sub>	=	Initial totalizer reading from the dispenser, gallons
G <sub>f</sub>	=	Final totalizer reading from the dispenser, gallons
t	=	Elapsed time during dispensing event, seconds
60	=	Conversion factor, seconds per minute

**9.3** The correction factor for correcting observed values of the gas volume meter shall be calculated as shown in Equation 9-3.

$$y = \left[ \frac{V_r}{V_m} \right] \quad \text{[Equation 9-3]}$$

Where:

y	=	Correction factor for the gas volume meter's observed reading, dimensionless
V <sub>r</sub>	=	True volume from current calibration of gas volume meter, cubic feet
V <sub>m</sub>	=	Corresponding observed reading from gas volume meter, cubic feet



## **10. REPORTING RESULTS**

**10.1** Report V/L test data and other information as required in the Healy V/L Field Data Sheet at the end of this document. Districts may require the use of alternate forms, provided they include the same minimum parameters as identified in the Healy V/L Field Data Sheet.

## **11. ALTERNATE PROCEDURES**

**11.1** This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

GDF Name and Address _____ _____ _____	<b>Healy V/L Field Data Sheet</b>  Tee Connection Test Result (See Section 6.1) _____ ft <sup>3</sup> Date of Last Gas Volume Meter Calibration _____ Correction Factor for Gas Volume Meter _____ Pressure Measurement Device Calibration Date _____	Testing Firm Name and Address: _____ _____ _____
		Phone No. (     )
		Test Performed by:
Test Date/Time:		District Test Witness _____
<b>Pre-Test Leak Check:</b> Initial/Final Pressures, in. H <sub>2</sub> O ____ / ____	<b>A/C #</b> _____ <b>P/O #</b> _____	Applicable ARB EO # VR-201-A
<b>Post-Test Leak Check:</b> Initial/Final Pressures, in. H <sub>2</sub> O ____ / ____		Allowable V/L Range 0.95 – 1.15

7.7.1 Pump #	7.7.2 Fuel Grade	7.7.3 Nozzle Model & Serial #	7.7.5 Initial Dispenser Totalizer, Gallons	7.7.7 Final Dispenser Totalizer, Gallons	Total Gas Pumped, Gallons	7.7.8 Time, Seconds	Dispensing Rate, gpm	7.7.4 Initial Meter Reading, ft3	7.7.6 Final Meter Reading, ft3	7.8 V/L	7.9 V/L Average (if necessary)	7.8, 7.9 or 7.10 Pass or Fail

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 6**

**HEALY PHASE II EVR SYSTEM LIMITED WARRANTY**

Healy Systems Inc., products are warranted for workmanship, performance, and materials when properly installed, used and maintained using the **ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD**. All Healy products, subassemblies, and raw materials are fully inspected and tested at the manufacturing facility. Healy warrants the workmanship and materials to be free of defects for a period in accordance with the provisions stated below:

- The equipment has been installed according to the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System Not Including ISD.
- The nearest Healy Certified Technician qualified to perform service on the defective equipment must perform warranty service. Only Healy Certified Technicians are allowed to perform warranty service. Use of service personnel other than qualified Healy Certified Technicians without prior written approval by Healy Systems Inc. will void the warranty.
- Claims for warranty repair or replacement service must have a written "Returned Material Authorization" (RMA) from Healy Systems, and must be shipped freight prepaid to Healy Systems for inspection.
- Healy Systems Inc., upon inspection at its facilities, and after determination of a warranty claim, will, at its option, repair or replace defective parts returned to its factory. Repaired or replaced parts will be returned freight prepaid by Healy Systems.
- Healy Systems is not responsible for labor or materials necessary to disconnect or connect the warranted product for return to Healy.
- Healy reserves the right to make changes in the design or to make additions or improvements with respect to its products without incurring any obligation to modify or install same on previously manufactured products, upon written ARB approval.
- Healy warrants the workmanship and materials of the following products to be free of defects for a period of fourteen months from the date of shipment from Healy: Inverted coaxial hoses, Hose adapters, Flow limiters and Breakaways.
- EVR Nozzles 900 Series – New & Rebuilt: Healy warrants the workmanship and materials to be free of defects for a period of fourteen months from the date of shipment from Healy. Exclusions: This warranty excludes the field replaceable "rubber/plastic" parts at the front of the nozzle (i.e., boot, scuffguard, face seal assembly, etc.) or the spout or parts that have been subjected to misuse, handling or incorrect installation.
- Vacuum Pump – VP1000: Healy warrants the workmanship and materials to be free of defects for a period of twenty-six months from the date of shipment from Healy. This applies to the vacuum pump and motor assembly only. The Hardware Kits, Vapor Kits, Electrical Kits and Interface modules are warranted for workmanship and materials to be free of defects for a period of fourteen months from the date of shipment from Healy.
- Clean Air Separator - Healy warrants the workmanship and materials to be free of defects for a period of 122 months from the date of shipment from Healy except for the Lockable ball valves, Locks, Master key, Float check valve and P/V Vent valve shipped with installation kit, which are warranted for fourteen months from the date of shipment from Healy.
- General Exclusions: This warranty shall not apply to any product which has been altered in any way, which has been repaired by any party other than Healy Certified Technicians, or when such failure is due to misuse or conditions of use. Use of non-Healy replacement parts, the unauthorized addition of non-Healy items to Healy equipment, and the unauthorized alteration of Healy equipment void this warranty.

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 6**

Healy shall, as to each defect, be relieved of all obligations and liabilities under a components warranty if the vapor recovery system or components shall have been operated with any accessory, equipment, or a part not specifically approved by Healy and not manufactured by Healy to Healy's design and specifications. Healy Systems makes no warranty with respect to the Healy performance of equipment or Healy's performance of services under this agreement, express or implied, and Healy Systems hereby disclaims the implied warranties of merchantability and fitness for a particular purpose.

- This warranty shall not cover any Healy System components that have been in contact with fuels containing greater than 15% methanol, 15% ethanol, or 15% MTBE by volume. Any component(s), which is exposed to M85/E85 fuel (or other alcohol-rich fuel), is not covered under the Healy Systems warranty. This warranty is a limited warranty. Anything in the warranty notwithstanding, implied warranties for fitness, particular purpose and merchantability shall be limited to the duration of the express warranty. Healy Systems expressly disclaims and excludes any liability for consequential or incidental damage for breach of any express or implied warranty.

**Healy...Specializing in Stage II Vapor Recovery Technology**

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 7**

**Nozzle Bag Test Procedure**

Verification of the integrity of the vapor valve shall be performed on installed nozzles by use of the following test.

Note: The following procedure requires that all nozzles on a dispenser be bagged at the same time. Bagging only one nozzle on a dispenser during this procedure may bias the results toward compliance.

- a. Seal all nozzles on a dispenser in plastic bags, using tape or other means to secure the bag around the base of the nozzle. Any plastic bag large enough to enclose the nozzles and having a thickness of no greater than 2 mils can be used. In California, 12" x 20" x 2 mil thick bags are available from the Air Resources Board by calling (800) 952-5588.
- b. Initialize the dispenser for fueling as follows:
  1. Inform the station operator that you are running a test and ask the operator to initialize the dispenser; or
  2. Swipe a credit card in the dispenser card reader.
- c. Activate the Healy vacuum pump by lifting one of the nozzles off the dispenser holster and selecting a grade of fuel. **Do not dispense any fuel.**
- d. With the dispenser initialized and the vacuum pump activated, observe all bagged nozzles for 30 seconds. Any nozzle where the bag can be seen visually collapsing has a defective vapor valve and the dispenser shall be removed from service immediately.
- e. Record the test results on the "Nozzle Bag Test Results" form provided in this Exhibit. Districts may require use of an alternate form, provided that the alternate form includes the same minimum parameters.
- f. Remove the bags from all the nozzles tested and disengage the dispenser by returning the nozzles to the dispenser holsters.
- g. Repeat steps a through f for each dispenser.

## NOZZLE BAG TEST RESULTS

SOURCE INFORMATION		TEST COMPANY INFORMATION	
Facility (DBA)/Site Address:	Facility Representative/Title:	Test Company Name/Address	# of Nozzles: _____
Print Name	Print Name	Print Name	# Nozzles Tested: _____
Street Address	Title (      )	Street Address	# Nozzles Passed: _____
City                      Zip	Phone No.	City                      Zip	# Nozzles Failed: _____
District Inspector:	<input type="checkbox"/> P/O <input type="checkbox"/> S/A <input type="checkbox"/> A/C Number:	Date of Test:	Time of Test:

Dispenser	Gas Grade	Nozzle Type	Bag Collapse after 30 Seconds
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No

**Executive Order VR-201-A  
Healy Phase II EVR System  
Not Including ISD**

**Exhibit 8**

**Items to Consider in Conducting TP-201.3**

The instructions below are required when conducting TP-201.3 for this system. The tester shall document that each step was followed as indicated below and shall include this page of the Exhibit with the submission of TP-201.3 test results. Note that districts may require use of an alternate form to meet these requirements, provided the alternate form includes the same minimum parameters.

1. Prior to conducting TP-201.3, all four ball valves on the Healy Clean Air Separator (CAS) shall be closed, as shown in Figure 1, to isolate it from the UST system to permit the pressurization of the UST system.
2. Conducting TP-201.3 with any dispenser piping test valve in the closed position is **not** permitted. Any dispenser with a dispenser piping test valve in the closed position while conducting TP-201.3 will bias the test towards compliance.
3. After conducting TP-201.3, the four ball valves on Healy Clean Air Separator (CAS) shall be locked in their normal operating positions as shown in Figure 2B-5 of Exhibit 2.

Required Steps	Verification (please circle)
1. All four CAS ball valves closed before conducting TP-201.3	Yes No
2. All dispenser piping test valves open before conducting TP-201.3	Yes No
3. All four CAS ball valves in normal operating positions after conducting TP-201.3.	Yes No

Test Company:\_\_\_\_\_ Facility Name:\_\_\_\_\_

\_\_\_\_\_  
Print Name (Tester) Signature Date

Figure 1

Configuration of Healy Clean Air Separator to Conduct TP-201.3

